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# Near East/North Africa Report

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## NEW, RENEWABLE ENERGY SOURCES IN ARAB WORLD DISCUSSED

Paris AN-NAHAR ARAB REPORT & MEMO in English 17, 24 Nov 80

[Article by Dr Nouhad Baroudi, officer-in-charge of the Natural Resources, Science and Technology Division of the UN Economic Commission for Western Asia (ECWA)]

[17 Nov 80, pp 11-15]

[Excerpt]

The predominance of oil and gas as sources of energy in the Arab world obscures widespread use of other forms of energy in the region and their future potential. The following Special Survey on alternatives to oil and gas is in two parts and is by Dr Nouhad Baroudi, Officer-in Charge on the Natural Resources, Science and Technology Division of the UN Economic Commission for Western Asia (ECWA) and is published with his kind permission. It is derived from a paper which Dr Baroudi delivered at a seminar on new energy forms held at Sousse in Tunisia at the end of last month under the auspices of the Chambre de Commerce Franco-Arabe and the Union of Arab Chambers of Commerce, Industry and Agriculture. Part 1 of the survey covers hydro-electric power, nuclear energy and nuclear fuels.

New and renewable sources of energy are being utilised at present in almost all Arab countries, in one form or another. The most important to-date is of course hydropower, which has so far been harnessed in eight countries where it was responsible in 1978 for the generation of 15 Terawatt-hours (billion kilowatt-hours) of electricity. Nuclear energy can be found in four Arab countries, but in the form of training reactors for research and experimentation. Solar energy applications are going on in 17 countries, but principally for water heating and pumping. Energy from biomass is produced and widely utilised in the Arab world, but only in its primary forms in the sense that fuel wood, charcoal, agricultural wastes and animal dung are mainly used for domestic heating and cooking. Geothermal sources exist in nine Arab countries, but their use has been confined to non-energy purposes. Wind energy can be harnessed in at least 12 countries where wind is available at sufficient levels of velocity, but its applications have so far been limited to windmills.

New and renewable energy sources, however, do not account today for more than 6 per cent of total Arab primary energy requirements. This percentage is furthermore likely to decline in the future, despite a spectacular growth expected to take place in absolute terms.

This paper reviews the programmes and/or perspectives of the 21 Arab countries in the fields of hydro-electricity, nuclear power, solar energy, biomass, geothermal and wind energy, before assessing the role that these new and renewable sources of energy are likely to play in the energy balance of the Arab world in the coming 20 years.

### Hydro-electricity

Eight of the 21 Arab countries utilise at present hydro-energy for power generation, and in four of them (Egypt, Lebanon, Sudan and Syria) this source is the major supplier of electricity. Hydro-generation in the Arab world approached 15 TWh in 1978, as compared to less than 2 TWh in 1960. In relative terms, its contribution to total power supply peaked at 34 per cent in 1969, before gradually declining to 22 per cent in 1978. This downward trend is likely to continue in the future, and hydro-power output in the year 2000 is projected to account only for 6 per cent of the Arab world's total electricity supply, although it would exceed by 180 per cent its level of 1978 in absolute terms. By the turn of the century, 13 Arab countries would be using hydro-energy to generate power in one way or another, with Egypt, Iraq and Sudan (in that order) producing more than 80 per cent of the Arab total.

Country programmes and perspectives in this field are summarised below:

In Algeria, the share of hydro-electricity in total power generation reached a peak of about 35 per cent in 1968, before declining more or less regularly so as to reach 5 per cent in 1978. Hydro-generation has also been reduced in absolute terms since 1973, because of the country's increasing needs for priority uses of water such as irrigation, municipal and industrial demand. Total installed capacity of about 287 Megawatts comes mainly from plants at Mansouring (100 MW), Algioum (90 MW) and other small stations in the Kabylia. It has been at around this level since the late 1960's and is not expected to undergo much change in the future. The authorities believe that the production level of 1977-1978 (250 GWh or million kilowatt-hours) could be maintained for another 25 years.

Djibouti has no hydro-power installations at present, but prospects do exist in two areas. First, a depression could be created in the Goubed Bay (155 square kilometres) at the end of the Gulf of Tajurah by building dams across the narrow passage between the Bay and the Gulf. Solar evaporation would then reduce the water level by 5 to 6 metres annually, so that generating capacity would reach 5 to 6 MW after the fifth year and 12 to 13 MW in the 17th year. Second, the Assal Lake has a surface area of about 300 square kilometres which is 174 metres below sea level. The project would involve building a 10-kilometre water canal from the Gulf of Tajurah to the depresssion; this would generate power during a first stage when the depression is filling, and a second stage by solar evaporation.

In Egypt, hydro-power has been the most important source of electricity generation. In 1970-1977, it was responsible for more than two-thirds of total power production. As of 1978, however, hydro-electricity's share has started a downward trend with no foreseen reversal. In fact, it is expected to decline to reach 28 per cent in 1985, 22 per cent in 1990 and only 15 per cent in the year 2000. This is because the river Nile accounts for virtually all the conventional hydro-power potential of the country, and about 80 per cent of this potential has already been harnessed at the Aswan dam (345 MW installed capacity) and the Aswan High dam (2,100 MW).

The operational capabilities of both the Aswan dams are severely constrained by conflicting irrigation needs and transmission system reliability. As such, the dependable generating capacity of both these plants is currently being assessed at less than two-thirds its nominal level, capable of generating about 9 TWh annually.

The untapped power potential of the river Nile consists of a 60-metre drop from Aswan to Cairo from which at least 350 MW are anticipated to be realised before 1990 with the extension of the Aswan High dam and the installation of generating facilities in three existing barrages at Nag Hamadi, Esna and Assiut.

## The Qattara depression project

The Qattara depression in the western desert is the other main hydro-power possibility. The project would involve canalising water from the Mediterranean to the depression, using a 60-metre descent to generate power. The depression has a surface area at zero level of 19,500 square kilometres, with the deepest point at 134 metres below sea level. Estimated capacity would be about 640 MW for the first 12 years while the depression is filling, and about 340 MW by solar evaporation thereafter. The Egyptian Electricity Authority, however, has indicated that capacity would reach a peak of 8,000 MW upon the completion of the four stages of the project. Due to the massive excavation work required, the first stage of the Qattara project is not expected to be completed before the late 1990's.

It is expected that the average load factor of Egypt's hydro-power stations would remain through the rest of the century equal to the current effective load factor of the Aswan dams, ie 66 per cent.

Hydro-power production started in Iraq in September 1972, when a 84 MW plant at Samarra was commissioned. With about 550 GWh, this station contributed in 1978 a little more than 8 per cent of the country's total electricity output. The authorities have planned for at least seven other hydro-electric projects to be completed by the turn of the century. Installations at Dokan and Hemrin are expected to be completed in the early 1980's, with a combined capacity of 450 MW, yielding an output of 1.58 TWh. Power stations at Derbendkhan and Haditha would add another 740 MW to the country's hydro-power capacity by 1990, with a corresponding addtion of 2.48 TWh in production. Dams to be built during the course of the 1990's at Mosul, Bakhama and El-Fataha are expected to bring total hydro-electric capacity in Iraq to more than 3 GW. This would generate a total output of 12.52 TWh in the year 2000, implying an overall load factor around 47 per cent.

## No hydro-electric production in Jordan

There is no hydro-electric production in Jordan at present, despite the existence of three dams (Khaled Ibn El-Walid dam, Al-Maqarin dam and King Talal dam) which have so fas been used solely for irrigation purposes, due to the country's primary need for water. Technically, the dams have a combined generating capacity of 91 MW and are capable of producing some 400 GWh with a 50 per cent load. The authorities, however, seem determined to develop hydro-power in Jordan, in view of its attractiveness as a clean, renewable source of energy which would also contribute to some extent to alleviate the fuel import bill. In this connection, the possibility of canalising water from the Gulf of Aqaba to the Dead Sea for power generation is under consideration. The surface area of the Dead Sea approaches 1,000 square kilometres at 400 metres below sea level, and the electricity that would be generated while the depression is filling and later through solar evaporation, is considerable. The project, however, would require massive excavation work to build the 180-kilometre water canal, thus involving heavy investment funds.

In the light of the above, it is assumed here that hydro-generation capacity in Jordan would be in the neighbourhood of 40 MW in 1990 and 70 MW by the turn of the century.

In Lebanon, hydro-power has been produced since the early 1930's (Al-Safa station) and has gradually developed into a major source of electrical energy for the country. Generating capacity reached 246 MW in 1968 and has remained at that level since then. The national electricity company EDL operates nearly 90 per cent of capacity (of which the Litani river installations represent 70 per cent), while the rest (27 MW) is owned by private stations selling their production to the public network.

The 1975-1976 civil war and the events of 1978 caused considerable damage to Lebanon's electric production, transmission and distribution installations. As a result, hydro-power generation had to be increased to compensate for the reduction in production of the most-affected thermal stations, with the consequence of raising the overall load factor of hydro-electric plants from an average of 35 per cent during 1970-1974 to 49 per cent in 1978.

EDL plans do not provide for any significant expansion in the Lebanese hydro-power capacity. However, the addition of 36 MW to the Litani installations at Al-Awali station, which had been planned before the civil war, may well have taken place by 1985. In that year, the load factor is expected to average around 40 per cent, before increasing to 45 per cent in 1990 and 50 per cent in the year 2000.

In Morocco, the contribution of hydro-power to total electricity generation, which averaged as much as 90 per cent during 1960-1965, has been declining since then but still represented more than 35 per cent in 1978 (1,416 GWh). In mid-1979 there were 18 hydro-electric stations having an average production potential of 1,584 GWh, two-thirds of this coming from four large plants (Afourer Ait-Ouarda, Bine El-Ouidane, Im'Fout and Idriss the First).

The authorities are determined to develop fully the country's untapped potential. During the first half of the 1980's, some 540 GWh will have been added to hydro-power output through the extension of the Lalla Takerkoust station and the commissioning of four new plants (Oued El-Makhazine, Al-Massira, Merija and Dechra El-Oued). As for the rest of the century, a number of hydro-electric schemes are envisaged, which include the utilisation of some 13 new waterfalls and the use of the Tah depression in the south (a small replica of Egypt's Qattara depression) and two smaller depressions located nearby (Hamirah and Tisfurin) to generate power. It is expected, in the light of these planned projects, that hydro-power production would have reached 2.4 TWh by 1990 and 3 TWh by the year 2000.

## Saudi Arabia's plans

Saudi Arabia is studying the feasibility of transforming the Gulf of Dawhat Salwa into a depression for helio-hydro-electric generation. The total area involved is 6,460 square kilometres, and the depression would be created by building a dam between Saudi Arabia and Bahrain and another dam between Bahrain and Qatar, of a total length of 58 kilometres in shallow waters. The project is estimated to produce 70 MW of electrical energy at an optimum head of 12.4 metres, and the power would be shared with Bahrain and Qatar.

Somalia has limited possibilities for hydro-power generation on the Juba river, where a plant is expected to be commissioned in the near future.

Hydropower generation started in Sudan back in 1962, when it accounted for 2 per cent of the country's electricity output. This percentage has been steadily increasing since then and reached about 54 per cent during 1976-1978. Production approached 500 GWh in 1978, generated by three plants at dams on the upper reaches of the Blue Nile and its tributary the river Atbara, with a combined capacity of 116 MW. The largest of these plants, at the Roseires dam, is being expanded by another 80 MW to reach a total capacity of 170 MW.

The various cataracts and rapids on the Nile have considerable hydro-power potential, which has been estimated by the authorities at about 3,770 MW from eight possible stations. Of this potential capacity, only 160 MW are presently being developed, and there are plans for an additional capacity of 800 MW to be installed by the year 2000.

The present load factor stands in the region of 49 per cent, but future projects are planned to produce power at about 70 per cent load, since they would be mainly intended for electricity generation, while existing schemes have other functions such as irrigation and flood control. Accordingly, the average load factor of hydro-power installations is projected to increase gradually to reach 65 per cent by the turn of the century.

## The importance of the Euphrates

Syria's most important hydro-power and irrigation source is the Euphrates river, which accounts for 88 per cent of the country's water resources. A large basin development scheme on the Euphrates has already been completed, comprising a reservoir, a dam and a power station consisting of eight units of 100 MW each. Generation from this plant exceeded 2 TWh in 1978 (more than 80 per cent of the country's total electricity supply) and was expected to reach a peak of 2.4 TWh in 1979, before starting to decline by about 40 GWh annually due to increased diversion of water and pumping requirements for irrigation purposes. In addition to this 800 MW Thawra plant, there are a few small hydroelectric stations with a combined capacity of 23 MW, namely, at Souk Wadi Barada near Damascus (7 MW), at Rastan between Hama and Homs (8 MW), and at Shezar near Hama (8 MW). These small plants add some 50 GWh to the country's annual hydro-power output.

There are some possibilites for further hydro-power development in Syria, notably two dams on the Euphrates and another dam on the Khabour river, a tributary of the Euphrates, with an estimated combined capacity of 300 to 400 MW. The authorities have planned to commission these stations between the late 1980's and the early 1990's. It is projected here that 300 MW would have been installed by 1990, with an additional 100 MW during the 1990's. As for the average load factor of hydro-power generating installations in the country, it is estimated to gradually decline from 34 per cent in 1979 to 27 per cent in 1990 and stabilise at about that level for the rest of the century.

In Tunisia, hydro-power contributes a small part to total electricity generation. Four plants at El-Aroussia, Nabeur, Fernana and Kasseb, with a combined capacity approaching 29 MW, have been producing between 20 and 70 GWh annually, the output fluctuating with the scarcity of water. Apart from a new plant of about 25 MW at Sidi Salem which is scheduled to be commissioned in the early 1980's, prospects for further development of the country's hydro-power capacity are not considered too bright. It is, therefore, projected that hydro-generation would average some 80 GWh annually through the 1985-2000 period.

### Nuclear power

Whether the introduction of nuclear energy in the Arab world for large-scale electricity generation is a sound option on economic, social, political and environment grounds, is an important subject which deserves careful investigations that go beyond the scope of the present study. It will only be stated here that the major arguments put forward by nuclear proponents – namely, that it is a cheap and clean form of energy best able to fill the energy gap – call for serious scrutiny, particularly in a developing area endowed with tremendous hydrocarbon resources and sunlight.

#### 1. Reactor technology and research

Plans have been reported in 10 of the 21 Arab countries, eight on a commercial level and two on a research and experimentation level.

Algeria's National Declaration (Decree No 76 of July, 1976) has explicitly opted for the establishment of an effective nuclear technological development as a means to ensure a long-term energy source and at the same time to give impetus to national development in science and technology. The Centre de Sciences et de la Technologie Nucléaires (CSTN), established in the late 1960s, initiated an ambitious programme for the development of nuclear technology and research. About one-half of Algeria's expenditures on science and technology (45 million Algerian Dinars – $12 million) is assigned to CSTN activities, which cover uranium processing, enrichment, reactor technology, nuclear materials, electronic simulation, theoretical and applied nuclear physics, health physics, and the nuclear fuel cycle. The authorities expect that Algeria will soon be able to manufacture and operate its own reactors.

According to the IAEA, three units of 150 MW each would be in operation by 1990, and it is expected that this capacity would have been doubled by the year 2000.

In Egypt, it would be necessary to install a number of nuclear power stations with a total generating capacity of 6,000 MW by the year 2000 in order to meet electricity demand, according to the Electricity Authority. In the meantime, the commissioning of four stations with a combined capacity of 1,800 MW is optimistically scheduled for commissioning between 1978 and 1990.

The necessary arrangements are currently being made for the installation of the first plant at Sidi Krir on the western coast near Alexandria, with a capacity of 600 MW. Other sites under study are in the Lake Bourollos area on the coast between Alexandria and Port Said, and also on the Red Sea coast.

It is projected here that nuclear power generation would be responsible for about 13 per cent of total Egyptian electricity output in 1990 and for about 32 per cent in the year 2000. These shares are lower than the 20 and 40 per cent, respectively, predicted by the Electricity Authority.

Iraq's Atomic Energy Commission was established back in 1956. Research is going on at the Nuclear Research Institute (Tuwaitha) and at the Nuclear Research Centre (Baghdad) with experimental reactors. Cooperation agreements have been concluded with France, Italy and the USSR. A 2 MW Russian research reactor has been operating since 1968 at the Tuwaitha Institute. France is reported to be providing shortly a 70 MW training reactor and installing a 600 MW nuclear plant which would be commissioned by 1985. A French fast breeder reactor is also under negotiation for later.

By 1990, according to the IAEA six units of 150-200 MW capacity each would be in operation in the country. It is expected that by the year 2000 Iraqi nuclear capacity would have reached 2000 MW.

Kuwait's plans up to the year 2000 envisaged the installation early in the second half of the 1980s of a station of about 600 MW, which would be followed in the early 1990s by a plant of the same size. The acquisition of two more stations of 1,200 MW each would subsequently be considered, thus allowing for a total installed capacity of 3,600 MW by the turn of the century. A cooperation agreement has been signed with Britain. The acquisition of a 50 MW training reactor has been under consideration, as well as the establishment of a nuclear energy commission.

### Kuwait reconsiders its nuclear programme

More recently, however, the Kuwaiti authorities have been reconsidering the country's nuclear energy programme, in view of the ever-increasing costs of reactor installation and operation. As a result, it seems likely that the implementation of the programme would be deferred for a few years at least. It is projected here that nuclear electricity would not be produced in Kuwait before the early 1990s, and that nuclear capacity would have built up to some 1,800 MW by the year 2000.

In Lebanon, Electricité du Liban seems to have plans for nuclear power in the future, but no indication is available concerning the possible size of the projected plant nor the date of operation.

In Libya, an Atomic Energy Commission was founded in 1975. Research is expected to start soon at Al-Fateh University, in cooperation with the USSR, which may provide a 10 MW training reactor. Reports have mentioned that a 440 MW plant would be constructed by the Russians and another 600 MW station by the French. Plans for a heavy-water reactor might also be considered. Other cooperation agreements have been concluded with Argentina and India.

In its draft long-term plan for the electricity sector prepared recently, the Libyan Secretariat of State for Electricity (SSE) expects that a 400 MW nuclear plant would be in operation in the country by 1990. The SSE does not foresee any increase in capacity during the 1990s.

Morocco is negotiating with France over the possibility of installing a 200 MW reactor which could be commissioned in the mid-1980s. R & D activities have been initiated at Rabat University. According to IAEA forecasts two units of 200 MW each would be in operation in the country by 1990. As for the year 2000, installed nuclear capacity could reach 600 MW.

Saudi Arabia has no intention at present to introduce nuclear energy on a commercial scale, but considerable emphasis is being put on R & D activities, which have started in three universities. A training reactor of 6 MW was to be installed at Dhahran University under a cooperation agreement recently concluded with France. A nuclear medicine centre has been established in Riyadh. A large multi-purpose national nuclear research centre is planned by the Ministry of Petroleum and Minerals, which is at present in control of nuclear energy pending the establishment in the near future of an atomic energy commission.

The IAEA, however, has predicted that a 150 MW unit would be operating in the Kingdom by 1990. This capacity is expected to be double by the year 2000.

Syria established an Atomic Energy Commission in 1976, and the authorities recently declared their intention to introduce nuclear energy on a commercial scale in the 1980s. There are plans for the installation of two units of 600 MW each, which would be in operation in 1989-1990. Two similar units are projected to be added before the turn of the century.

In Tunisia, R & D in nuclear energy is underway at the Institut de Recherche Scientifique et Technique. There are plans to introduce nuclear electricity in the country in the late 1980s, with the installation of a 250 MW reactor. This capacity is expected to have tripled by the year 2000.

An average load factor of about 60 per cent is considered a likely estimate for the Arab world as a whole up to the year 2000.

### Nuclear fuel availability

The effective exploration and extraction of uranium deposits in a number of Arab countries is by now an accepted national objective, which is seen to be justified by the need for a long-term regular supply of nuclear fuel as a prerequisite to establishing any independent national nuclear capacity, let alone certain alarming forecasts of a world shortage of uranium in the not-too-distant future. It should be noted, however, that uranium, after extraction, needs to be enriched before entering the nuclear reactor, and enrichment technology is at present the monopoly of a few countries, primarily the USA and the USSR.

### Primary deposits

In Algeria, geological and ground surveys started in 1970 and exploration drilling is underway in the southern part of the country. Primary uranium ore deposition is estimated at between 28,000 and 78,000 tonnes. In Democratic Yemen, certain uranium-and thorium-bearing concentrations of heavy sands have been reported, but recent investigations tend to indicate that they are uneconomic or marginal. Radiometric surveys have also revealed a number of interesting anomalies of uranium and thorium in granite massifs. In Egypt, geological mapping has been undertaken in various parts of the country, and extensive areas have been covered by airborne surveys for radioactivity since the late 1950s and more than 7,000 anamalies have been identified. Recently, significant finds have been reported in the eastern part of the Egyptian desert, near Mount Jilala El-Bahria. A uranium production plant is under construction, with an expected output of 100 tonnes in 1981. On the other hand, some monazite (a mineral containing uranium and thorium) exists with black sands sedimented on the northern shores of the Nile Delta. Exploration is underway in Iraq, with promising prospects.

In Jordan, carborne and band scintillometre surveys have shown that the Zarqa-Ma'an rift valley is the strongest radioactive area in the country. Some exploration is going on in Libya in cooperation with Argentinian, French and Japanese firms.

In Mauritania, intensive exploration programmes have been underway since 1957, including geological mapping, radiometric airborne and ground surveys, performed by France, Japan and the Total company. By 1974, numerous rich anomalies had been found.

In Morocco, widespread uranium mineralisation was reported in the 1940s and 1950s by unsystematic surveys undertaken by France and the US. A national plan of action was set up in 1968, and significant progress was made in exploration whereby two highly radioactive areas were located. Present estimates of uranium reserves range from 47,000 to 1.54 million short tonnes of U $O_8$.

## Intensive exploration in Arabian peninsula

In Saudi Arabia, intensive exploration for radioactive mineral deposits has been carried out since the early 1960s, using airborne scintillometre and spectrometre surveys followed by some ground checking. No discrete uranium minerals were found, but certain areas were considered to warrant further investigation. Recently, however, some reports indicated that uranium and thorium occurrences may well have been detected in these areas by a French firm.

In Somalia, airborne and ground surveys as well as exploration drilling have been carried out since the 1960s. In the Bur area, 400 anomalies were located, of which 49 were of interest. In Mudug province, 14 anomalies were found which showed that uranium mineralisation was represented exclusively by carnotite. Primary uranium ore deposition is estimated at between 6,000 and 10,000 tonnes of $U_3O_8$, mainly at Wabo, Dusa-Markeb and Mirig in the Mudug province and at Alio-Ghelle in the Bur area.

In Sudan, geological mapping followed by radiometric airborne and gound surveys revealed four areas of radioactive occurrence. Uranite has been reported in association with copper and iron ores, and thorium-bearing black sands were identified. Further surveys are being carried out in the Hofrat-En-Nahas areas in the western part of the country.

In Syria, a team of Russian geologists undertook a geological mapping programme in the early 1960s followed by airborne surveys which indicated some distinct radioactive zones. Exploration is at present carried out by British firms in the southern desert, through field and aero-radiometric surveys.

In the UAE, radioactive anomalies located by airborne and ground spectrometre surveys have been recently confirmed to be due to potassium-rich rocks and not to uranium or thorium deposits as was originally believed. Large areas of Yemen abound in the same kind of rock from which uranium is being extracted elsewhere. Exploration projects, however, will require time and heavy expenditures.

[24 Nov 80, pp 11-15]

[Text]

### Solar energy

**This section presents a brief review of current and planned activities in solar energy R & D and applications in the Arab world. A detailed study on the subject is underway in cooperation between ECWA and OAPEC.**

The sun is a source of energy of unlimited quantity. It is free, clean safe and widely and generously distributed in the Arab world. Saudi Arabia alone receives the equivalent of one hundred trillion ($10^{14}$) kWh of solar energy every day, theoretically enough to supply the electricity needs of the whole OECD area for 20 years. Moreover, solar power technology is much simpler than nuclear technology and could be easily transferred to and assimilated by developing countries. Investments require a much smaller foreign exchange component than nuclear energy. Solar costs are likely to follow a downward trend due to rapid technological advances, whereas nuclear costs are constantly on the rise. Finally, solar energy may be safely used in a number of applications other than electricity generation, such as for space and water heating and cooling, water desalination, water pumping, crop drying, cold storage, for greenhouses, sewage treatment, industrial process heat, etc.

Interest in solar energy in Arab countries started in the late 1950s and early 1960s (Sudan, Tunisia), but it was not until R & D efforts were seriously stepped up in the Western world during the past few years that official attention was devoted to the question in the Arab world. Solar energy conferences and/or exhibitions were held in Saudi Arabia (1975, 1978), Libya (1976), Tunisia (1977), Bahrain (1977, 1978), Egypt (1978) and Morocco (1978). Government bodies or commissions for solar energy were established in six Arab countries, and nine solar research laboratories are already operating or planned. Annual R & D budgets add up to about $27 million in the Arab world (of which Saudi Arabia alone accounts for $15 million ), compared to a federal US budget approaching $1 billion. Solar energy R & D in the Arab world is carried out in insolation (11 countries), photovoltaic conversion (seven countries), solar thermal conversion (five countries), solar storage (four countries) and concentration (two countries). Chemical conversion studies are practically non-existent.

Solar energy ongoing and planned applications in each of the 21 Arab countries are summarised below.

In Algeria, a comprehensive feasibility study on the application of solar energy and its role in the overall energy picture by the year 2000 has recently been undertaken. A "solar village" is to be set up which will use solar energy in water heating and pumping, space heating and cooling, refrigeration, thermal and photovoltaic conversion. A solar furnace built by the French in the 1950s is expected to produce steam for a thermal electricity turbine of about 30 kW. A solar thermal conversion unit of 10 kW is also planned. There is an Algerian section of COMPLES (Coopération Méditerranéenne pour l'Energie Solaire) which serves as a link with the international solar energy community. Cooperation is mainly with France and West Germany.

The solar energy programme in Bahrain was initiated in 1977 by the Bahrain National Oil Company (BANACO) in cooperation with the Kuwait Institute for Scientific Research (KISR). A feasibility study was commissioned in April 1978 to study the potential of solar energy in the country, including the identification of applications and a commercialisation strategy. Cooperation is also underway with West Germany and Britain.

No known solar energy activity is being considered in South Yemen at present. Climatic conditions, however, appear quite favourable, and average solar intensity is theoretically equivalent to a power generation of around 200 kWh per square metre per year, assuming 10 per cent radiation efficiency.

### French developing solar irrigation in Djibouti

In Djibouti, a solar pump is being installed with French bilateral aid for irrigation purposes. Possible areas for future solar energy applications include the Assual Lake and the Goubed Bay, which could both become precious sources of hydroelectric generation by use of solar evaporation.

In Egypt, studies have indicated that direct daily solar intensity averages about 3,500 kilocalories per square metre in winter and double that amount in summer, theoretically equivalent to a power generation of about 150 and 300 kWh per square metre per year, respectively, assuming 10 per cent radiation efficiency.

Solar energy use started at the turn of the century when the British built a 37 kW solar water pump. Another start took place in the early 1960s when solar water heaters were produced domestically and sold for EL 100 ($142) each, before production was discontinued for lack of interest. Solar energy activity is now diversified and undertaken in cooperation with many countries, mainly Canada, France, West Germany, Italy, Saudi

Arabia, Sweden and the US. Although the Egyptian solar programme is at present one of the most active and diversified in the Arab world, it seems to rely too much on outside funding for support.

The Egyptian Solar Energy Laboratory (SEL) of the National Research Centre is at present handling five projects: two thermal power plants totalling 7 kW, solar cooling, solar drying and solar desalination. The SEL has also plans for the domestic manufacture and marketing of solar flat-plate collectors. The Solar Energy Commission, established in 1976 under the auspices of the Ministry of Electricity and Energy, is dealing with numerous projects, including the Qattara depression hydroelectric generation plant, solar reverse osmosis, water heating and space heating cooling for a 100-room hotel on the north coast, a 5 kW solar pump with a cooling and freezing unit, three pilot solar water heaters of different types equipped with flat-plate collectors, 1,000 solar water heaters for domestic and community usage, various meteorological and testing stations, a complete "solar village," cooling and freezing stores for fish at the High Dam Lake, solar desalination, one 10 kW and one 100 kW solar thermal conversion units, two mobile 5 kW units for desert research, and many other projects. Six universities are carrying out applied research in various aspects of solar energy use, including rural applications which seem to hold promising prospects after the success of some demonstrations to villagers.

The private sector has also been active in promoting solar energy applications in Egypt. A 620-room hotel to be built near the Pyramids will make use of the sun for electricity generation, water and space heating, cooling and ice-making. A project for a solar water heater factory, with a production capacity of 100,000 heaters during the first year and 300,000 heaters thereafter, has been submitted to the National Industrialisation and Investment Committee for approval.

Iraq seems determined to encourage solar energy utilisation, although no solar applications are yet in view in the public sector. Al-Mustansiriyah University is co-operating with the Foundation for Scientific Research to develop a solar energy programme for the country. Immediate plans are to design solar collectors with local materials for space and water heating, water desalination in remote areas, yellow corn drying in winter, greenhouse night-heating in winter, solar energy use in desert zones, and the establishment of a solar energy research centre.

## Third World participation in Jordan

Average insolation in Jordan is theoretically equivalent to a power generation of about 200 KWh per square metre annually, with 10 per cent radiation efficiency. The country's solar energy programme started in 1971 at the Royal Scientific Society (RSS), and a Department of Solar Energy was established at the RSS in 1975. Co-operation partners include Australia, France, West Germany, India and Kuwait (KISR), as well as ALECSO and the CEC. The main activities have been water desalination (such as the Aqaba desalination plant commissioned in October 1977), "plastic agriculture," greenhouses, crop drying, ground sterilisation, photovoltaic telephones in rural areas and along highways (100 units installed as of August 1978), a 200 kW solar powered thermal electricity station for use in an integrated "solar village," and solar water heaters. A project for the development of a domestic solar water heater industry was started in 1972 by the RSS. There are at present two companies in Amman producing 30 heaters per day, and about 20 other such firms in the West Bank. Jordanian universities are not contributing much to the country's solar energy development.

Another major possibility for solar energy application in Jordan is to link the Gulf of Aqaba with the Dead Sea by a water canal to generate power by use of solar evaporation.

Kuwait experiences a daily insolation of about 45,000 kilocalories per square metre, which is theoretically equivalent to a power generation of around 2,000 kWh per square metre per year, assuming 10 per cent radiation efficiency. A major solar energy programme was initiated in September 1976 under the responsibility of the Kuwait Institute for Scientific Research (KISR). In Kuwait and the Gulf region, solar heating and cooling of buildings are areas of great potential which are developing into a viable domestic industry, in cooperation with US institutions. A 100 kW solar thermal conversion unit will be commissioned in February 1981, in cooperation with a West German firm. It is expected to generate an average of 800 kWh per day. It would be used as part of an integrated food (greenhouse) /water (desalination) /power (electricity generation) complex particularly suitable for isolated communities. Cooperative programmes have also been concluded with Bahrain and Jordan.

## Lebanese Solar Energy Society set up in April

Lebanon was emerging as an active centre for solar energy activities when the war started in 1975. Institutions concerned with solar enrgy are the National Council for Scientific Research (CNRS), the American University of Beirut and Saint-Joseph University. Close cooperation has been established between these three institutions, and emphasis is being put on solar heating and cooling of buildings, water desalination, photovoltaic conversion, insolation and integrated solar architecture. A pilot project is being implemented on solar heating of an apartment in Beirut. The CNRS, whose representative has recently been elected Vice-President of COMPLES (Coopération Méditerranéenne pour l'Energie Solaire), aims to establish a solar energy centre in Lebanon. Recently, the private sector has been showing considerable interest in the introduction of small-scale solar energy applications, particularly solar heating and cooling of buildings. Finally, a Lebanese Solar Energy Society was created in April 1980.

In Libya, solar energy activities are getting underway. There are indications that an autonomous solar research institute may be set up. A centre for Solar Energy Studies was established at the Arab Development Institute at Tripoli in June 1978. Solar work is also being undertaken at the Atomic Energy Commission and at two universities (Al-Fateh and Qar Yunis). Emphasis is on solar thermal conversion, heating and cooling of buildings, water desalination, solar drying, water pumping, and refrigeration. The first solar energy device, a water pump for irrigation purposes, was installed in the Sidi Rhuma area in May 1978. Cooperation is underway with Canadian and US firms.

Solar energy activities in Mauritania are at present limited to the installation of French-made water pumps for municipal and irrigation purposes. After a first rather unsuccessful attempt in 1973, a 5 kW photocell pump has recently been installed, and there are plans for six other pumps. A "solar village" at N'Takat, to be built with French assistance, has been under consideration. Three different ministries are concerned with solar energy applications, and emphasis will be put in the future on water desalination, fish drying, cold storage, water heating and solar electricity for rural settlements. Apart from France, cooperation is underway with Senegal.

In Morocco, solar water heaters have been known since the early 1940s. Demand has been increasing rapidly but has so far been met by imports, due to the lack of a domestic solar water heater industry. A study on the possibilities of solar energy utilisation in the country has been prepared recently by the Ministry of Energy and Mines, which is at present studying a helio-hydroelectric power plant project at the Tah depression (and perhaps two other smaller depressions) using solar evaporation, similar to the scheme for the Qattara depression in Egypt. Other plans of the Ministry include solar thermal electricity in remote areas, a solar energy research centre, and solar demonstration stations. Interest in solar energy has also been shown in three universities/schools, where projects include the establishment of a photovoltaic laboratory and solar energy applications in the mining industry. It was recently decided to establish a Moroccan section of COMPLES.

In Oman, a few experimental solar water heaters were installed at Salalah by the British in 1971. The US also assisted in preparing in 1977 a study on possible solar energy applications in the country, which recommended the use of photovoltaic cells for electricity generation and water desalination and the utilisation of solar water heating in remote villages. Two villages in Dhofar were chosen for this. The installation of a 15kW solar electricity plant has also been under consideration.

In Qatar, a British experimental photovoltaic generator started operating in 1977. No firm solar plans have been formulated yet, but areas of interest include solar thermal conversion, solar heating and cooling of buildings, and an integrated food/water/power complex.

## Saudis have Arab world's biggest programme

Saudi Arabia has the largest solar energy programme in the Arab world. From the first photovoltaic beacon installed by the French at Madinah Airport in the early 1960s, use of solar energy has been growing on an ever-larger scale. Serious efforts were initiated in 1969 at Dhahran, and by now four universities (Dhahran, Riyadh, Jeddah and Dammam) are active in almost all fields of solar energy, as are a number of ministries and institutions. The Saudi Arabian Centre of Science and Technology (SANCST), established in 1977, tries to co-ordinate these efforts. In early 1978 the decision was taken to set up a Solar Energy Society in the Kingdom. Cooperation agreements have been concluded with Austria, France, West Germany and the US. The Saudi-US programme is the largest, extending over five years at a total cost of $100 million to be contributed equally by each party.

Amongst the most significant solar applications underway or planned in Saudi Arabia are (a) a "solar village" 50 kilometres outside Riyadh to be completed by 1981; (b) a solar-powered heating complex for the Airborne School at Tabuk, which is the largest project of its type in the world; (c) a huge heliostat-electricity generation project in the Eastern Province; (d) an industrial plant in Jeddah to manufacture solar components for heating and cooling buildings; (e) a "solar building" in Jeddah; and (f) an integrated solar energy complex at Jubail on the Gulf.

Special mention should be made of a helio-hydroelectric generation project which is still under study, whereby a depression would be created in the Gulf of Dawhat Salwa by building dams between Saudi Arabia and Bahrain and between Bahrain and Qatar. The project would be similar to that of the Qattara depression in

Egypt and would have a capacity of 70 MW to produce electricity using solar evaporation.

Saudi Arabia has also been active in providing financial assistance to universities in Australia, Niger and the US in solar energy R & D.

In Somalia, direct solar radiation has been estimated to be theoretically equivalent to an annual power generation of around 200 kWh per square metre, assuming 10 per cent radiation efficiency. Solar energy activities have been carried out in cooperation with UNICEF since 1976 and with ECA, India, Italy, UNESCO and UNIDO since 1978. A modest pilot solar desalination plant to supply drinking water for a fishing community at Khuda on the Indian Ocean was scheduled for completion in 1979. Another solar distillation plant of a larger size is also underway. Plans include integrated solar/wind/biogas energy utilisation in rural areas.

## Interest in Sudan since the early 1970s

In Sudan, solar energy has been since the early 1970s a field of interest at the Energy Research Institute and at Khartoum University. Work has been underway in insolation, heating, refrigeration, water desalination, food drying, photovoltaic conversion and low/high temperature thermal conversion, including power plants in remote areas for electricity and irrigation purposes. Cooperation comes from Denmark, France and The Netherlands. Two solar pumps have been installed, one at the Institute's premises in Soba for demonstration, and the other at the Hillat Hamed village to supply households with water. A project for a "solar village" at Umm Safari (North Kordofan) is under study.

Solar energy activity in Syria started in the mid-1970s at Aleppo and Damascus Universities, with emphasis on heating and cooling systems, solar storage and concentration, and solar cells. After the Ministry of Electricity had established a Solar Energy Committee in 1977, solar applications started moving ahead, mainly in the direction of locally manufactured solar water heaters. A housing project at Dummar is to be supplied with 500 of these heaters, and a number of summer youth camps will have solar-heated water. A solar water and space heating system may also be installed at the Al-Tall Institute of Political Studies.

Tunisia's Institut de Recherche Scientifique et Technique has been active since 1963 in space cooling, water heating and water desalination. Three solar desalination stills were built, providing 8,200 litres of fresh water per day, but were unfortunatley abandonned six years later. A National Energy Commission was established in 1977 and has been considering legislation to promote solar energy applications and usage, including subsidies and tax deductions for solar users and investors, the establishment of a solar energy commission and a photovoltaic laboratory. Interest in solar energy is also evident in universities and other institutions throughout Tunisia, with emphasis on insolation, photovoltaics, solar cooling and heating, solar electricity generation, solar water pumping and solar cookers. Cooperation is underway with Australia, the CEC, France, West Germany, Italy, Sweden, Switzerland, UNEP and the US. A Tunisian has recently been elected President of COMPLES.

Solar energy applications already existing or underway in Tunisia include 11 photovoltaic water pumps, a small solar desalination still, a number of water heaters installed in private homes and public schools, a solar-heated swimming pool on Djerba Island, and an assembly plant for flat-plate collectors. Plans include the installation of a solar thermal power plant in the 50 to 100 kW range, the local manufacture of collectors and their use for water and space heating.

In the UAE, the integrated food/water/power complex installed on Saadiyat Island (Abu Dhabi) in the 1960s with US assistance is one of the major solar energy applications in the Arab world. A 90 kW diesel turbine generates electricity, while the waste heat is recycled to desalinate water for drinking and to grow vegetables in greenhouses. A French-made solar water pump of 1 kW is also operating at Al-Ayn at an experimental farm. Contacts with foreign groups in France, West Germany, Italy, Sweden and Switzerland have been made for such solar applications as water pumping, cooling and heating of buildings, solar thermal conversion and photovoltaic conversion. A feasibility study for the development of solar energy technology in the UAE is under preparation.

## Americans involved in Sanaa University scheme

In Yemen, direct solar intensity measured in Sanaa, Hodeida and Taiz averages about 5,000 kilocalories per square metre per day, which is theoretically equivalent to a power generation of more than 200 kWh per square metre per year, assuming 10 per cent radiation efficiency. The country has been seeking US assistance in developing a solar energy programme at Sanaa University, but no solar applications have been introduced so far.

After this brief review of ongoing and planned solar energy activities in the Arab world, the virtues of this safe, non-polluting, widespread and renewable source of energy cannot, in conclusion, be overemphasised. Of special importance is the concept of an integrated food/water/power complex which is particularly suited for isolated communities far removed from the electricity grid and have access only to sea or brackish water. There are many such areas in the Arab world. Technology is accessible and adaptable, costs are reasonable, operation and maintenance are simple, and such a complex can meet the electrical energy, fresh water, vegetable and poultry requirements of a community.

## Biomass conversion, geothermal and wind energy

This section gives a sketchy and incomplete presentation of the potential for biomass, geothermal and wind energy in the Arab world. Detailed studies on the availability, utilisation and prospects of these three energy sources in Arab countries are underway at ECWA.

### Biomass conversion

Energy from biomass is produced and widely utilised in the Arab world, in the sense that fire wood, charcoal, agricultural wastes and animal dung are used principally for domestic heating and cooking. Such traditional energy souces still represent a major part of total energy requirements in some countries. However, the interesting form of biomass energy, namely conversion by hydro-generation, pyrolysis or fermentation (biogas), is practically non-existent. The raw materials for biomass conversion are widely available, what is essentially needed is government action to harness this important energy source.

Certain Arab countries are contemplating more seriously than others the exploitation of biomass for energy production. For instance, Egypt is undertaking studies in cooperation with Sweden on the possibilities of converting agricultural and animal remains into biogas for energy purposes and fertiliser production in rural areas. Lebanon is investigating the possible use of municipal wastes for biogas production. Studies on the possible use of biomass energy in rural areas are being carried out in Saudi Arabia. In Somalia, plans for integrated solar/wind/biogas energy systems for rural areas are being formulated. Sudan produces annually about 13 million tonnes of agricultural wastes, mainly cotton stalks and bagasse, which are partly used for energy purposes by direct combustion. The authorities are now contemplating the conversion of such wastes by pyrolysis into fuel for use in boilers of sugar factories, and the relevant studies are being undertaken by the Energy Research Institute under the sponsorship of the Sudanese National Research Council. In Syria, there are plans for utilising municipal wastes (about 300,000 tonnes in Damascus alone) and agricultural wastes to produce energy and fertilisers. In Yemen, a number of public baths (hammams) in Sanaa are reported to use municipal wastes for heat production, and there are plans for a more expanded and rational use of energy from biomass in the future.

### Geothermal energy

The Arab world lies within various geodynamic zones which allow for different types of geothermal fields. Five distinct favourable environments have been identified: (a) the Orogenic Mediterranean zone, including Morocco and the northern parts of Algeria, Tunisia and Libya. (b) the Red Sea – Gulf of Aden – East Africa triple tectonical rift system, including the eastern parts of Egypt and Sudan, Djibouti and Somalia, to the west; and the western part of Saudi Arabia, North Yemen and South Yemen, to the east, (c) the Jordan valley fault system, including Lebanon, the southern part of Syria, Jordan and Iraq, (d) a number of intracratonic volcanic centres, such as in the southern part of Algeria, Libya, the southwestern part of Sudan and the central part of Saudi Arabia, and (e) large sedimentary basins, including north-central Africa and the Arabian Peninsula. Within the first four environments, medium (80 to 150°C) to high (150 to 350°C) temperature geothermal sources could be expected at relatively shallow depths, thus allowing for the operation of small-scale electricity generators (1 kW to 1 MW) and, in some cases, larger plants (10 to 100 MW). As for the fifth environment, hot water reservoirs could be found in medium depths, which might be used for electricity generation through binary fluid systems or for direct heat production.

Geothermal sources have been identified in a number of regions in the Arab world, and investigations are underway to assess their potential contribution to the energy balance of the countries concerned. For instance, in South Yemen, there is a hot spring at Sidara which gives birth to Wadi Hajar, the only perennial river in the country.

In Djibouti, exploration has been going on since 1969 in Daguiron-Gelafi, Goubed and the Abbe Lake. In 1974-1975, drilling in the Asab field revealed considerable amounts of hot wet steam that could yield a power generating capacity of 1.5 to 2 MW. The country's geothermal energy potential is considerable, but development financing seems to be a major constraint.

In Egypt, a number of wells and natural springs yielding water at 40 to 60°C have been found around the Gulf of Suez and down the western coast on the Red Sea, in the Halwan area and in various parts of the western desert. Such low temperature waters are expected to be harnessed in the future for domestic and commercial uses. Prospects for discovering geothermal sources up to 150°C are considered good, and these sources would be utilised for electricity generation through binary systems. Finally, the possibility exists that high temperature sources (above 150°C) lie within the Earth's crust under the Red Sea; these would be used directly for electricity production.

## Good geothermal prospects in Jordan

In Jordan, there are good prospects for the exploitation of geothermal energy, particularly in the Jordan river valley, which is the site of a number of hot springs, and also in the Zarqa-Ma'an rift valley. Upon the recommendation of a team of French and Italian experts who visited the country in 1975, the Jordanian authorities have been investigating the question with the assistance of the United Nations.

In Saudi Arabia, there are plans for the exploitation of the Kingdom's geothermal energy potential.

In Somalia, exploration is underway, and the authorities are placing high hopes on the contribution of geothermal sources to the country's future energy balance. In Syria, geothermal sources have been discovered in the Orontes valley and the Palmyra mountains. The Higher Council for Science believes that there are good prospects for more finds in the future. Studies to harness this energy source are underway.

In Tunisia, the possibilities of exploiting domestic geothermal resources are being investigated.

In North Yemen, geothermal potentials do exist, particularly in the area of recent volcanic activity 25 km east of Dhamar (a town about 100 kilometres southeast of Sanaa) with temperatures reaching 180°C of dry heat on the surface. There are also hot springs in various parts of the country, such as in the Damth area (about 150 kilometres southeast of Sanaa) where a number of localities carry a toponymic denomination starting with "hammam." Some assistance in studying the possibilities of exploiting these sources in Yemen came from Italy in 1975 and in 1976.

Geothermal energy is not so well known in most Arab countries, and interest in that energy source has so far been less keen than in other new and renewable sources such as solar energy. This is probably due to the fact that the technology and economics of geothermal energy are variable according to geological situations, not to mention the importance of the initial investments in some cases.

### 3. Wind energy

The wind, like the sun, is a free, clean source of energy, widely distributed in the Arab world. It is well adapted to the needs of rural communities. Its technology is simple and it can generally be harnessed wherever wind is available at certain levels of velocity. Interest in wind energy has recently been growing in the Arab world, where a number of countries are carrying out studies and experiments to assess the potential of this renewable energy source.

For instance, in South Yemen, there are wind recording stations in Aden and Mukalla, but the best potential exists in the slopes and valley of the hinterland.

In Egypt, two areas, around Marsa Matrouh on the Mediterranean and around Horghada on the Red Sea have so far recorded average wind speed high enough (about 20 km/h) to warrant further investigations for the development of wind power generation. There were as of April 1978, 11 wind recording stations in various locations on the Egyptian coasts. Cooperation is underway with the US Agency for International Development and the University of Oklahoma to install a complete experimental wind power station in one of the two locations mentioned above.

In Jordan, the Royal Scientific Society is studying the possibility of producing electricity from wind-powered generators. In Lebanon, windmills have been in existence for many years, and there are plans for a more important utilisation of wind energy in the future, particularly for electricity generation.

In Mauritania, a comprehensive study of the potential for wind energy utilisation in the country is being undertaken with the assistance of France. Morocco's Ministry of Energy and Mines has been studying the possibility of using wind energy along with solar systems. In Oman, consideration is being given to install a pilot plant at a village in Dhofar to generate electricity using wind energy.

Somalia's potential for wind energy use is considered good, and the authorities are seriously contemplating the development of this alternative energy source. Wind velocity at Berbera, Chisimaio and Magadishu ports is approximately 20 km/h but varies greatly from one place to another in the hinterland. The gradual introduction of windmills and wind-powered generators in the country is given high priority by the Government.

CSO: 4820

## REGIONAL COOPERATION SEEN AS KEY TO FOOD SECURITY

Kuwait KUWAIT TIMES in English 11 Nov 80 p 4

[Text]

FOOD security in the Arab world can be realised through the utilisation of Sudan lands, Kuwait's fertilisers and oil revenues, a specialised report said yesterday.

In spite of the increasing rate of agricultural production in the Arab world, none of those countries have reached the stage of self-sufficiency in food, the Arab Organisation for the Promotion of Agriculture said.

Due to an improvement in living standards and increasing population, the Arab world is more and more relying on imported food, the report added.

Over 16 per cent of the Arab population are facing problems of malnutrition and one third of the inhabitants are lacking in proteins and calories, the Organisation warned.

Geographical conditions, scarcity of water, manpower shortage and increasing costs of fertilisers were cited as main problems which confront agricultural development in the Arab world.

Lack of adequate investment in agriculture sectors coupled with poor planning are also hindering efforts for progress, the report added.

### *RECALLED*

The report called for the improvement of the agricultural infrastructure through proper planning and new legislation.

It called for the encouragement of collective efforts and the provision of administrative and financial facilities.

The organisation stressed the important role of the agricultural cooperatives and demanded up-grading of marketing systems.

Sudan's vast lands can cope with the agricultural requirements of the entire Middle East and a large part of Africa's need for meat, the report said.

While Syria and Iraq can cope with the needs of the Arab world for wheat Lebanon and Jordan can provide its fruit and vegetable requirements, it added.

### *SUITED*

The north African Arab states can grow adequate supplies of citrus, bananas and olives while Sudan and Egypt will produce larger quantities of cotton.

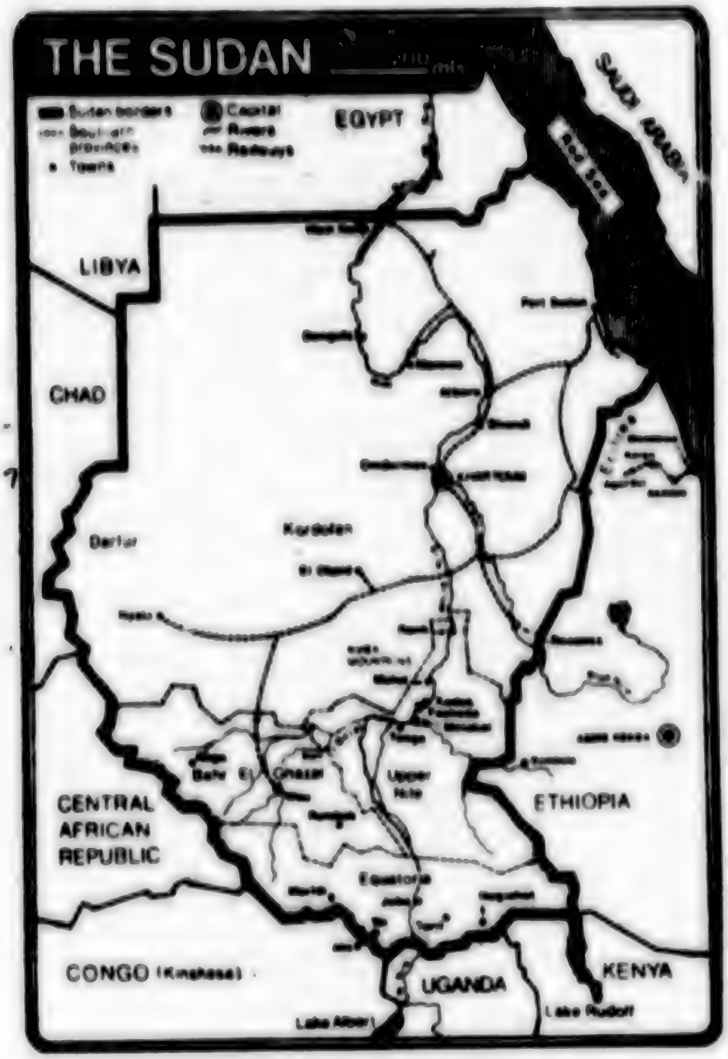
Kuwait and Saudi Arabia are well suited to secure the need for fertilisers while the oil industry can well invest surplus funds in agriculture, the report added.

It has been proved beyond doubt that no single Arab state can implement its own food security programmes and the need for collective participation is obvious, the Organisation's report said.

Iraq and Syria are presently engaged in ambitious plans to promote the agricultural sectors through the introduction of mechanised farming systems.

A 72 per cent increase in appropriations for agricultural promotion is planned by Iraq and Syria adding $100 million to their agricultural fields, the report said.

In spite of prevailing difficulties, the creation of an agricultural common market seems the one and only channel for solving this problem, the Arab Organisation said — Kuna.


THE SUDAN
Sudan borders
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EGYPT
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LIBYA
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Kordofan
Darfur
El Obeid
Bahr El Ghazal
Upper Nile
ETHIOPIA
CENTRAL AFRICAN REPUBLIC
Equatoria
CONGO (Kinshasa)
UGANDA
KENYA
Lake Rudolf
Lake Albert

CSO: 4820

## SCHOLAR SUGGESTS VATICAN TYPE HEADQUARTERS FOR ISLAM

Kuwait KUWAIT TIMES in English 13 Nov 80 p 4

[Article by A. Haque Choudhury]

[Text] **SYED Yousef Hashem Al Refai, an eminent Kuwaiti scholar, has called for a Vatican type Muslim headquarters in Mecca or Rabat which could ensure a uniform policy to resolve crises in the Islamic world.**

He noted that there were a number of Muslim organisations with policies varying a great deal. A centralised system could avert a number of problems arising from such a situation, he added.

Al Refai was talking to Kuwait Times on the eve of his departure to Bangladesh on a seven-day visit at the invitation of Islamic organisations and ulemas of Bangladesh. Accompanying him is Abdul Razzak Mutawa, a Kuwaiti philanthropist.

Asked about the financial support for the 'Muslim Vatican' proposal, Al Refai pointed out that there were a large number of Awkaf organisations which could contribute towards the goal.

Al Refai said their visit to Bangladesh was a goodwill mission aimed at fostering the Islamic brotherhood and cooperation among the Muslim peoples. During their stay they will visit the seats of Islamic culture, religious institutes and study life in Bangladesh.

**CONFLICTS**

The Ambassador of Bangladesh to Kuwait, M.A. Barek, who was also present during the interview, pointed out that this non-official visit to Bangladesh coincided with the advent of 15th Hijra century.

In reply to a question, he disclosed that their initial survey would help in determining the form of assistance that Islamic institutes of Bangladesh need for their development.

Turning to the conflicts among the Muslims, he expressed concern over the current Iraq-Iran war, saying that such a show-down would only benefit the enemies of Muslim world.

He said the big powers have already succeeded in diverting world attention from Jerusalem and Afghanistan where the people are fighting for the restoration of their legitimate rights.

Al Refai regretted that after the death of former Egyptian President Gamal Abdel Nasser, Islamic bloc had fallen victim to disunity and narrow nationalisms. He said disunity among Muslims and Arabs had led to strengthening the Jews occupying the Arabs lands.

**WELCOME**

Asked what steps could be taken to ease the tension among Muslim states, he said, 'there is no magical remedy to cure this disease which has plagued us for a long time.'

Al Refai, strongly supported the views expressed by H.H. the Amir, and the Crown Prince Premier Sheikh Saad on the advent of the 15th Hijra century.

He particularly supported the proposal about an Islamic court of justice for resolving all the disputes and conflicts faced by the Islamic world. The Bangladesh Ambassador also expressed his opinion that the Amir's proposal should be brought to the next Islamic Conference Organisation (ICO) for reviewing and subsequent implementation.

CSO: 4820

## ISLAMIC AFFAIRS

### GROWTH OF MAGHREBIAN FUNDAMENTALISM DISCUSSED

Casablanca LAMALIF in French Oct 80 pp 9-10

[Article by Mohamed Chaoui]

[Text] In recent months new indications of activity by "fundamentalist" Islamic groups have emerged in various countries. Though we cannot go into all the detail about every country, we can nevertheless at least point to some of the signs.

Without a doubt in Tunisia the "Muslim Brothers" (a rather vague name that covers both organized groups and a movement, a faction) are the most deeply rooted and constitute an actual political force. Their activity and influence have been on the increase ever since 1977, and the sermons given by their imams attract very large crowds and audiences in the mosques. In student circles (where 30 percent are their followers) and, in general, among youth (where unemployment and underemployment are out of control), they recruit new militants continuously. The period of Ramadan has become traditionally a time for a revival of activity for the Tunisian Muslim Brothers, who made themselves known for the first time in Sousse by sacking a cafe that remained open during Ramadan. This movement puts out newspapers (one of which was suspended for 3 months, and the manager of the other was arrested after the publication of an article against the Saudi Arabia regime), distributes a large quantity of brochures and cassetes. Relations with the regime are often quite tense (but nonetheless the Muslim Brothers [FM] condemned the commando attack on Gafsa) and though the fundamentalists apparently lack a precise alternative political program, they unceasingly attack the westernization preached by the regime and in particular the "lifting" of the obligation to fast during Ramadan (decided by Bourguiba in 1960) and the personal statute of 1956 abolishing polygamy as well as the policy of the institution of religious endowment and of the integration of elementary education with the Department of National Education. In short, it is the policy of secularization of public life and mores that is the favorite target of the "fundamentalists." But it is obvious that this only became possible in connection with the growing aggravation of the disparities between rich and poor and the decline in opportunities available to hundreds of thousands of young people doomed to joblessness. To characterize this climate, one must remember that on the morrow of independence, in the halcyon days of "Bourguibaism," the disparities between social classes were not very severe. The middle class has become considerably richer, and its system has resulted in a deterioration in the standard of living and a decline of opportunity for the majority. Now secularization, and modernization, appear to this dispossessed majority as the apanage of wealth, as the justification and even the symbol of the ostentatious welath of the well heeled. Also, the rejection being total, privilege and secularization are equated. Then, too, one must consider a still deeper factor: that having to do with the societal crisis (or identity crisis) being experienced by all the Arab-Muslim societies. Which only makes more complex the resort to fundamentalism, and perhaps explains both the impact of the movement and its political and organizational limits. The present situation in Tunisia is characterized by a certain liberalization, but tensions remain: strikers have been arrested, opposition political organizations are not always recognized, and with the high cost of living and commercial speculation, the social climate could deteriorate at any moment. Will the system be able to neutralize the growing influence of the Muslim Brothers, while the latter can more or less serve as an alternative to all those it [the system] consigns to the fringes? The persistent tensions and the constant activity of the fundamentalists are not, in any case, headed this way at the moment

## Identity Crisis and Social Disparities

In Algeria, the month of Ramadan was also the occasion for a revival of "fundamentalist" proselytism. This was also the occasion for the official National Union of Algerian Youth [UNJA] to open a campaign against the "Muslim Brothers" (FM) accused of being "the henchmen of imperialism and reaction" and "imposters" who are attempting to "undermine" the revolution (L'UNITE, a UNJA organ, August 1980). Thus in Algeria the authorities denounce above all the political character of the activity of the FM opposed to the "socialist option" which is a notion that fits in with "progressive Islam" (we note in passing that the UNJA organ praises the "Islamic revolution" of Iran and attacks Saudi Arabia and Sadat). We recall that it was in connection with education problems--which are still quite serious--that fundamentalism's most violent demonstrations occurred (riots at the university, especially). Thus the thorny questions of Arabization, and career selection carry a malaise which the FM want to channel for their benefit (in particular among the "Arabizing" who consider themselves wronged by the present system. Also the social problems linked to frantic urbanization, the rural exodus and unemployment are factors which deflate the official national and populist slogans and ideology and give to the sermons of the fundamentalists in more and more mosques a special resonance. But the regime seems to be more prepared than Tunisia's to deal with this process: on the one hand, it has never threatened the status quo in mores and tradition; on the other hand, it still relies on ad hoc solutions to resorb the social and cultural tensions.

Therefore, in order to catch up, the regime decided on the development of Islamic education and the creation of a department of Islamic Sharia [Islamic law] (at independence Koranic and elementary education had been integrated into [the Department of] Education, and the Institute of Advanced Islamic Studies had been eliminated). As an Algerian official said, "The people are facing an identity crisis" and nationalism expanded to a "total ideology" cannot respond to it. Thus the evolution of the "fundamentalist" movement in Algeria will be tied very closely to that of the activity of the state in the domains of teaching, jobs and urbanization, in particular. In Morocco the situation seems, at first glance, more complex. One finds the same basic characteristics of the "fundamentalist" push, namely the societal crisis and the aggravation of social disparities and problems. But the activity of the FM occurs in a context which, contrary to Tunisia and even more contrary to Algeria, is based on traditionalism; on the other hand, the existence of the religious centers whose influence has continued to be lively, represents a kind of "receptive structure" which could moderate the radical intentions of the FM; the relative recognition of the multiplicity of political and cultural currents constitutes perhaps also a "safety valve" in this sense, and finally the impact of the left opposition furnishes another alternative which has not yet undergone a profound deflation (such as is the case for Algerian "socialism"). All these are factors which make more complex the appearance of the phenomena of the FM in Morocco. Though it be certain that their influence cannot be ignored (in particular in the suburbs of the big cities), one can still not predict with certainty the reality of this impact nor the political nature of this movement. (In fact, the assassination of Omar Benjelloun indicates that manipulation cannot be excluded and, moreover, the trial of his assassins was recently th occasion for a demonstration organized by members of their association.) It is obvious, however, that the aggravation of the social problems constitutes promising terrain for the growth of fundamentalism, and the factors that up to now have limited its impact could be overwhelmed. It suffices to recall on this subject, the excesses of one Zitouni and his religious center at Fes, or again this quite special phenomenon--albeit rather isolated--of the peasants having resorted to the temples of the saints to vent their grievances against the abuses and injustices of which they were victims: in this way the fellah of the Kalaa Sraghna took refuge in the temple of Moulay Ali Charif in Marrakech in order to protest against their caid [Arab chief or judge] accused of wanting to disposses them of communal land (AL MOUHARRIR of 19 August 1980); still in the Haouz region, another similar case supposedly occurred at the temple of Moulay Brahim. Of course, one cannot attribute all these quite different situations to the impact of FM, but it is possible to see in them signs of a certain general change which the latter could be tempted to channel wherever they can.

One sees therefore that to varying degrees--reflecting the different political contexts, the same deep social malaise, and relatively similar social problems, the "fundamentalist" current is being felt throughout the countries of the Maghreb. Though in Tunisia it is unquestionably most visibly present, everywhere else it has also made inroads. Even in Libya, where Mouammar Qadhdhafi made himself the herald of a "revolutionary" Islam, it is not inconceivable that a more traditionalist "religious" opposition should evolve, given the limitations put on the role of the Ulamas by the regime and, on the other hand, the barely orthodox interpretation Qadhdhafi makes of Islam, since he contests the [validity of the] Sunna (stories of the Prophet and his companions) as the religious foundation. Doubtless Qadhdhafi's populist Islamism, strongly activist and proselytizing, does not fail to inspire some mistrust and anxiety in the Maghreb. Thus, both for Tunisia and Algeria (not to speak of Morocco where this motif is obsolete because of Libya's interference in the Sahara), there is apprehension over the impact this so-called "popular" and "egalitarian" Islam could have in their own countries, if circumstances were right.

9516
CSO: 4400

## BRIEFS

**BAN ON NEW WELLS**--Bahrain is to impose a two year restriction on the country's artisian wells in a bid to conserve water. Preliminary details of the measure, which bans the use of the country's main underground water supplies for two years, were released this week to the Gulf Mirror by Agriculture and Commerce Minister Habib Kassem. Said Mr Kassem: "We are particularly concerned about the amount of water which is wasted in Agriculture and Industry. The ban will apply to two geological zones A and B, which lie closest to the earth's surface. Water in these zones which is purer than water deep down, is being used up too quickly. We need a breathing space to protect supplies." Artesian needed in agriculture and industry [as printed] will still be available, but only for zone C, which is less pure than A and B and less accessible. "The move will force those involved to be more careful in distributing and conserving supplies," he said. Mr Kassem said the measure was in line with a new law passed this year aimed at tightening up legislation on water usage. Bahrain has one of the highest rate of water consumption in the world which is 75 gallons per head daily. Internationally the figure is between 45 and 50 gallons. He said further details would be made public following Cabinet approval of the final report on Bahrain's water resources. [Text] [Beirut THE ARAB WORLD WEEKLY in English 15 Nov 80 pp 17-18]

**FOOD FIRM**--The government of Bahrain now has a 51 per cent stake in the Bahraini-New Zealand Company for Trade and Storage (BANTS) after buying out the firm's three Bahraini shareholders, all local companies. Bahrain's Minister of Trade and Agriculture Habib Ahmad Qassem said the move was in line with his government's objective of attaining self-sufficiency for food. The government of New Zealand holds the remaining 49 percent stake in BANTS. [Text] [Paris AN-NAHAR REPORT & MEMO in English 24 Nov 80 p 10]

CSO: 4820

# PUBLIC CLAMORS FOR MILITARY TRAINING IN SCHOOLS

## Millions March

Tehran KEYHAN in Persian 26 Oct 80 p 13

[Text] Millions of Iranian students, alongside their teachers and parents, participated in a march and 'unity' prayer at the summons of Ayatollah Montazeri in order to neutralize the plot of brazen counterrevolutionaries, and commenced the Islamic republic's second 'Mehr' [23 Sep-22 Oct] month.

The march, which was also held in cities across the country, took place with even more complete splendor and greatness in Tehran.

Tehran's students began moving in the early morning hours from eight directions towards Tehran University, the meeting-place of those in the revolution's forefront. They carried posters of Imam Khomeyni, Ayatollah Montazeri, and the infatigueable warrior Taleqani, and shouted slogans about reopening the schools, and condemning the filthy plot of the agressor Ba'thist Iraqi government and its master, the United States.

Reports of KEYHAN's correspondents on the march ceremony indicate that the marchers were full of enthusiasm. Many of them carried books or notebooks, and placing them under their arms as if they were powerful weapons for the destruction of the enemy of religion and country, raised their fists in the air, and chanted while stamping their feet.

Our correspondents add: The participants in the First of Mehr [23 September] march, after transversing the designated routes, gathered at Tehran University. There the ceremony from 1100 hours of followed the prepared program. After recitation of a passage from the glorious word of God, a message from the imam concerning recent events was broadcast. Then a member of the District and University Unity Council read the text of a message from the council which, while congratulating the students upon the commencement of the school year, requested the total vigilance of brother and sister students against counterrevolutionary plots.

Then a presidential message was read by one of the students, as follows:

In the name of God, the merciful, the compassionate. Students, dear children of the Islamic nation. Your school year begins on a day when the children of Islamic

Iran have stood up manfully and firmly against the aggressor forces; the resistance that Muslim youth has shown is one of the most valuable achievements of the Iranian Islamic revolution. Our enemies fancied that our armed forces have no morale, that it had been lost, and... They did not know that when faith and belief were involved, the reconstruction of the armed forces was completed very rapidly. Our enemies fancied that our army would not resist, and nourished half-baked thoughts. But they came up against steel walls of resistance. Dear brothers and sisters, our enemies fancied that weapons make a war. Lo, they see that belief and faith make firm a war - the faith of the Islamic nation's children has been shown in action, and future days will make this concrete faith even more evident.

Dear students, the enemy had no expectation of such capability, experience, and scientific training in our armed forces - and lo, airplanes and armored forces are shot down and destroyed one after the other. It even becomes clearer to us to what degree scientific knowledge and experience is valuable, and it becomes clear to them that our armed forces have not spent their lives falsely. The construction of Islamic society requires firmness of belief along with rapid scientific and experimental progress - scientific knowledge is not separate from belief; to whatever degree your level of true knowledge increases, to whatever degree you transform the study environment to an environment for the fruition of talent, to whatever degree your preparedness for monotheistic society increases, to whatever degree the school environment becomes one of science and Islamic understanding, to that degree the steps we make towards our goal will be faster, and we can build the Islamic republic more firmly.

My dears - it is in your faces that the lines of tomorrow's society take shape, it is in your pure faces that the lines of belief, knowledge and decision for the protection of an unswerving life and the stability of a free Islamic society must reach total clarity. Your responsibility today is very great because of your role in preserving the safety of the country today for the building of tomorrow's society. From God on high I ask for your success in carrying out this responsibility, and I hope that the victories of the Islamic revolution run one after the other like waves across your joyful and successful faces.

After this Mohammed 'Ali Raja'i, prime minister of the Iranian Islamic Republic, delivered a speech concerning recent occurences and the First of Mehr [22 September]. In a portion of his speech he said:

The largest bases of our revolution are the schools, the revolution's best capital our children. We have come forward in all our strength to guard this capital with the greatest possible vigilance. This is because these innocent children condemned the commanders of oppression, despotism and arrogance with their pure, warm blood and their chants of 'God is great'.

The prime minister then said: These beloved children are all striving together so that through the deepest possible understanding of the revolution's ideals, they can prepare themselves for the future of their beloved revolution and Islam.

Mr Raja'i said: It is not only we who are aware of this great and beloved force. The enemy also had his eyes fastened upon it, and throughout the entire summer he plotted so that he would be able to make an onslaught when the schools reopened, and exploit the re-opening for his own purposes. But God granted us success in forcefully identifying and smashing these plotting idolators.

Mr Raja'i's speech continued: Today all the nation's organs and all those who feel a responsibility for the revolution are watching over the great student force because the counterrevolutionary, by resorting to various strategems, is plotting to weaken the relations between the responsible organs and the students. At the same time all of our students have come to learn Islamic ideology from pledged teachers, and in the future take part as prepared officers in the perpetual struggle of truth with evil.

In another portion of his speech the prime minister said: Saddam Hoseyn and Carter and all the Idol's forces of East and West must know that we struggled for God, the Koran and Khomeyni, and we have them in our hands. Because we had God, the Koran and Khomeyni, we overthrew the biggest idolatrous powers. And today Saddam and Carter, with all their facilities and savagery cannot take these dear things from us which we gained by our own blood.

After the prime minister's speech, a united prayer took place, led by Hojjatoleslam Seyyed 'Ali Khamene'i, Tehran Friday prayer leader. Between the two prayers, 'Ali Akbar Parvaresh, representative from Esfahan in the Islamic Consultative Assembly, delivered a speech concerning recent events and pressure from foreigners through counterrevolutionary radio broadcasts from abroad.

After prayer, the march declaration was read.

## Students Declaration

Tehran KEYHAN in Persian 26 Oct 80 p 13

[Text] At the end of yesterday's student march, a twelve-point declaration was framed and read as follows:

1 - We condemn the desperate efforts of the Iraqi regime and the plots of the domestic associates of the superpowers in the western region, and announce our total readiness for sacrifice in the path of Iran's Islamic revolution. We ask officials for the greatest possible decisiveness in shattering foreign agents.

2 - We ask officials to expand military training in the schools as much as possible, so that an army 20-million strong will be established as quickly as possible.

3 - The Islamic revolution must be exported to all the oppressed, tyrranized nations of the world so that their century-old hopes can be realized. Therefore we ask the Islamic revolutionary government to expand their efforts in this regard as much as possible.

4 - While renewing our unbroken pact with the great leader of the revolution, the great imam of the oppressed world, Khomeyni, we emphasize that we deem the incontestable authority of the imam's line over the Majles, the government and other organs to be an obligatory and indispensable matter, and we condemn any effort to assert a line other than the imam's.

5 - We ask the respected Cultural Revolutionary Council to take the fastest possible steps in the path of the educational revolution; to transform that

system, to purge it completely, to purify books and rewrite them, and to prepare lessons for students compatible with the Islamic revolution.

6 - We ask officials to purge all teachers associated with the counterrevolution or a line other than the imam's from the Ministry of Education; to appoint suitable cadres and ideological groups which conform to the Islamic revolutionary line; and not to surrender to the superficially intellectual and ideologically unsound recommendations by which, under the pretense of examining beliefs, so-called revolutionary teachers are being expelled.

7 - Alongside the rest of the people, we announce our support for all the efforts of pledged teachers and students to neutralize the plots of the superpowers and their domestic stooges.

8 - Unfortunately, the administrative revolution has lost its upward and effective path. Officials must carry out this task to its Islamic limit with the participation of Islamic societies and all the Muslim masses, and completely cleanse all forms of corruption and idolatry from Iranian bureaus and offices.

9 - We request the Islamic Consultative Assembly to investigate the hostage problem as decisively as possible, and not to surrender to impressions calculated to make the hostages look oppressed.

10 - We ask the arming of the Muslim people and the devoted followers of the imam through dependable and proven channels, such as the Komiteh and Mobilization guards, in order to prepare them for confrontation with every kind of plot and intrigue.

11 - A culture which seems martyrdom and a spirit which fosters martyrs is a great and unbreakable weapon of Islam. Our Islamic society must refrain from every sort of consumer culture, individualism, corruption, welfarism and western tendencies so that we can move forward to heroic reconstruction.

12 - We announce to the dictatorial and mercenary regime of Saddam Hoseyn that our hearts beat in anticipation of the wondrous command of the imam, so that with a shout from the great masses we can rush to the help of our Muslim brothers in Iraq, and sever the Ba'thist regime, meaning Saddam's U.S. puppet regime, from the region.

## Support in Provinces

Tehran KEYHAN in Persian 26 Oct 80 p 13

[Text] Yesterday, the first day of the school year, teachers and students from primary, junior and senior high schools across the country attended class, following the advice of the nation's imam and responding to the summons of His Holiness Ayatollah Montazeri. After class teachers and students took to the streets for a wonderful march, condemning the plots of foreign agents.

In Kermanshah, student revolutionary groups and organizations marched and proclaimed their readiness, accompanied by the clergy and all classes of people. After the march they went to the Friday Mosque to pray, and held a 'unity' prayer.

Despite Iraq's air attacks the night before last and yesterday over Kermanshah's air space, and the bombing of its airport, the heroic people of Kermanshah and surrounding cities took part in the students' march with no anxiety whatsoever.

In the border region of Javanrud, near Kermanshah, tribes and border-dwellers, students and teachers participated in a march and shouted slogans against the United States and Iraq. At that time a propaganda official for the Reconstruction Crusade gave a speech concerning the preservation of unity among all the people. A six-part declaration announced support for the Islamic republic and readiness to do battle with the mercenaries, and was ratified by the students' cries of "God is great."

A splendid march was also held in Esfahan. In order to put on this march the Cultural Section of Esfahan's Martyr Foundation organized a staff, and the people were asked to express their views towards having the most splendid students' march possible. Similar ceremonies in other cities of the province were also held.

In Bushehr as well students took part in marches after the governor had published an announcement. Students in surrounding cities of the province also took part in marches, and through their unity turned the last hope of the counterrevolutionaries into despair. These counterrevolutionaries had foolishly thought that they could prevent the holding of classes by means of delusive and seditious slogans.

According to reports of KEYHAN correspondents from Rudsar, Rasht, Khorramabad, Aligudarz, Qom, Dorud, Ezna, Kuhdasht, and other districts of Lorestan, Galugah, cities in the provinces of Mazandaran and Gilan, Fars, Khorasan, Sistan va Baluchistan, Yazd, Kerman, East and West Azerbaijan, Hormozegan, Kohkiluyeh va Boyer Ahmad, and cities and villages in other provinces of our country, students answered the summons of High Faqih Ayatollah Montazeri, and by participating in marches and unity prayers, once again showed their unity in the face of imperialism's plot.

9597
CSO: 4906

## COMMENTS ON RCC DECISION TO EXECUTE THIEVES

Baghdad AL-JUMHURIYAH in Arabic 2 Nov 80 p 4

[Article: "Execution for Anyone Who Perpetrates the Crime of Theft"]

[Text] The Revolutionary Command Council [RCC] decided to execute perpetrators of the crime of theft as specified in Article 440 and Paragraphs D and E of Article 433 from Penal Code No 111 of 1969.

Text of the decision follows:

No: 1631.

Date: 30 October 1980.

Based on the provisions of Paragraph (A), Article 42, of the Interim Constitution, in its session held on 30 October 1980, the RCC decided the following:

First: Any person who perpetrates any of the following crimes shall be sentenced to death:

1. The crime of theft as specified in Article 440 from revised Penal Code No 111 of 1969.

2. The crime of theft as specified in Paragraph (D), Article 443, from Penal Code [remainder of line illegible].

3. The crime of theft as specified in Paragraph (E), Article 443, from the Penal Code.

Second: This decision shall be enforceable from the date of its publication in the official newspaper and until further notice.

Saddam Hussein
President, RCC

Official Source Comments:

In a statement to the INA [Iraqi News Agency] yesterday an official source commented on the importance and scope of the decision, stating that certain unscrupulous persons have taken advantage of the current situation and the preoccupation of our armed forces and the platoons of the People's Army with combat missions against the Persian enemy. They are burglarizing houses, taking advantage of blackout conditions at night in the streets, alleys and squares, and the fact that many of the houses are missing their men, who are participating in honorable combat on the battlefields or elsewhere.

He added that, since the punishment imposed for such crimes as these when they are perpetrated under normal conditions is not suitable to a state of war, which requires that the punishment be made harsher in order to deter others. These actions are incompatible with the simplest prerequisites of citizenship and are considered treason against the nation which requires very determined and strong opposition: For these reasons the decision made punishment harsher for theft which occurs during a state of war on a populated patrol at night and at all other places of residence.

9605
CSO: 4802

# ECONOMIC PROGRESS IN WEST BANK REVIEWED

Tel Aviv MA'ARIV in Hebrew 10 Sep 80 p 23

[Article by Yovel Elitzur: The 'Open Bridges' After 13 Years" (A)]

[Text] In Bayt Sahur which is near Bethlehem everyone knows the Abu-Ayta family. More precisely, it is not a family, but an entire tribe—whose branches dominate many of the manufacturing enterprises which this mostly Christian municipality excels in.

One branch of the family controls an enterprise for knitted products and another branch manufactures mother-of-pearl trinkets, plastic sponges, accessories for electrical appliances, as well as several of types of plastics utensils.

Work is plentiful, and workers are brought in even from Gaza. But the members of Abu-Ayta are not content. They see no future for their enterprises. Most of the entrepreneurs of Judea and Samaria share these feelings of insecurity and frustration.

After 13 years of Israeli domination, more than a half a million residents of Judea and Samaria perceive themselves as fluttering between the east and the west. Their living standard is increasing on an average of more than 11 percent annually, a rate double that prevalent in Israel. There is no unemployment. The economy enjoys the best of both worlds, as it were: It is connected by its umbilical cord to the Israeli economy but profits as well from an uninterrupted flow of funds from the petroleum countries in the Persian Gulf.

But everyone knows that this abundance is supported by nothing. Production is at a standstill and the expansion of agriculture is in danger.

Nicola Abu-Eyta, smiling, courteous businessman who in the past served as mayor of Bayt Sahur, tells that he established the Jordanian Plastic Company in 1958, and after the Six-Day War established a similar enterprise in Amman. Many other manufacturers did likewise in Judea and Samaria. The Government of Jordan does not permit export of manufactured goods form the West Bank unless they have been manufactured from raw materials that have been transported over the bridges. Except that it is unprofitable for manufacturers in Judea and Samaria to bring raw materials this way and that is not only because importing through the port of 'Aqaba is expensive and time consuming, but also because the rigid security inspections on

Allenby and Adam Bridges effectively prevent the transport of goods--particularly with respect to sacks of PVC and polyethylene.

## 1948-1967 Policy: Prevent Industrialization of Judea and Samaria.

Eysa, the son of Nicola who helps his father manage the enterprise in Bayt Sahur, says that the output is marketed principally in Judea and Samaria. "We can't compete with the Israeli enterprises neither with samples nor by the credit arrangements which are customary in the Israeli market. We're not as successful in confronting inflation as are our competitors." However, another worker in the enterprise reveals: "The enterprise in Amman is larger, has newer equipment, but production at Bayt Sahur is greater."

While refusing to be quoted, the manufacturers in Judea and Samaria admit that the Jordanian prohibition on transporting manufactured goods which were made from raw materials that did not come through Jordan--it is merely a continuation of the policy adopted by the Hashemite Government between the years 1948 and 1967, when the rule of the West Bank was in its hands: to prevent industrialization in Judea and Samaria, and to establish the manufacturing base of the kingdom on the East Bank. The official explanation for the import restrictions involves the regulations of the Arab Boycott, that is: the need to prevent any Israeli components from being part of goods marketed in Arab countries.

Manufacturers in Judea and Samaria are also prepared to admit that these restrictions, while being bothersome and hindering the development of their enterprises, integrate very well with the goal which in any case exists among the entrepreneurs in Bethlehem, in Ramallah and in Nablus: to spread investments so as to assure a base also in a more secure location, and not to risk accumulation of capital on the West Bank alone--where (in their view) the war may break out anew at any hour.

A short trip through Bayt Sahur will immediately reveal the odd contradiction with which the residents of Judea and Samaria live between the prosperity of the individual and the shattered base of the economy. New white and reddish stone homes are springing up on every one of the sides of the sloping hills on which the municipality is built, and blend well with the dusty, rocky landscape of these last days of summer. There is a great deal of activity in the many workshops scattered through the narrow back streets. The owner of an enterprise which fashions images of Christian saints from olive tree-trunks, reveals: "I don't even consider export to Jordan. I sell everything in Bethlehem, and I can't even fill all the orders." The luxurious green Volvo of Nicola Abu-Ayta parked at the enterprise, stands out against the background of the obsolete and all-too-pathetic equipment of the plastics enterprise, and illustrates a picture of simultaneous expansion and retardation.

## How the Sixth Fleet Was Discovered

During the first week of July 1967, when trucks loaded with vegetables of the Jenin merchants crossed the Jordan River eastbound at the shallow water pass of Tel-abu-Tzuz--with the tacit agreement of a number of Israeli local officers, but without a specific decision by the Israeli authority--an economic-social planning group was sitting in Jerusalem, which at the conclusion of its work (two weeks subsequent to that) recommended to the government certain steps to assure open economic borders for the passage of goods between the two banks of the Jordan River. The group did not know that its recommendations had been implemented even before they had been reduced to writing.

The decision regarding the "open bridges" was doubtless one of the most daring and revolutionary not only in the history of region, but also in the procedures of holding an area after conquest. Few remember today that the decision to close an eye to the initiative of the vegetable merchants in Jenin was intended not only to solve the problems of the residents of the area, in whose hands after the Six-Day War there remained a bumper crop of tomatoes, cucumbers and eggplants, as well as an abundance of cantaloupe and watermelon--but also the problems of the Israeli farmers, who were concerned about unanticipated competition coming from the region which had suddenly been included within the area of jurisdiction of Israel.

It will be recalled that those responsible for Israeli agriculture searched at that time for other markets for the output of Judea and Samaria, and discovered among other things, the U.S. Sixth Fleet in the Mediterranean, whose sailors were hungry for fresh fruits and vegetables. "We shall bombard the American warships with melons," --Ariel Amiyad, who was then the general manager of the Agriculture Ministry, proposed.

The effects of the deed were far-reaching, and not a single one of its initiators may argue that he foresaw them. In effect, to this very day, the full theoretical implications as to what has happened to the economy of Judea, Samaria and the Gaza Strip over the past 13 years have not yet been assessed. Immediately following the Six-Day War, Israeli planners brought for the proposals regarding the settlement of Arab refugees from Gaza into agricultural villages in the region of Al 'Arish and even into the West Bank. Plans were laid for manufacturing centers which would be exempt from tax liability to any jurisdiction, and in which multinational companies would be permitted to establish enterprises and benefit from cheap manpower and from "freedom from taxes."

## High Birthrate, A Significant Percentage of Children

Even in the Galilee Paper which was prepared in 1973, there was still a discussion of the need to invest 1.2 billion Israel Pounds within 5 years for the development of the Occupied Territories. Even this plan was not implemented, as is known, and today we know that every Israeli plan "for the settlement of refugees" and for "development" was not only superfluous--inasmuch as the standard of living of the regions's residents increased at a dizzying pace even without the Israeli "development"--but would have impeded a process that was desirable for Israel, whose genesis was in the "open bridges" policy.

The various development plans overlooked a number of simple facts: the Judea and Samaria area is in effect a much too restricted area, lacking water for irrigation or wide, level expanses suitable for agricultural development. Even the number of employed whose problem had to be allegedly solved is limited: a total of 135,000 persons, including those working in their agricultural economies. In the year 1967, the number of those prepared to go out into the labor market was even smaller.

The bridges that were opened in July 1967 and the Israeli market that was discovered during that period, solved the immediate problem of the surplus of agricultural output. The open bridges also helped the residents of Judea and Samaria, who since 1948 turned eastward to the rich petroleum countries to find more remunerative employment, to continue to emigrate in that direction. The Israeli economy, which began to gain strength following the Six-Day War from the slow pace of the year preceding the war, even began to absorb workers from Judea and Samaria and Gaza. Approximately 40,000 registered workers from Judea and Samaria--one-third of all the manpower of the West Bank--today is employed in Israel.

The very aggressive modernization of the agricultural economy in Judea and Samaria incessantly freed workers from the family economies in the village, and those immediately joined the work force which today earns its livelihood outside of its places of residence. If, despite this, the portion of those participating in the work force from among the region's population is relatively small, it can be explained by the high birthrate--a very significant percentage of the inhabitants of Judea and Samaria are children--in the high net number of women who are not working (inasmuch as their husbands and brothers work elsewhere and send home a goodly part of their wages) as well as by the fact that the educational system is more developed: compulsory education also includes the 15-year-olds.

The "open bridges" policy did not bring about, however, an "integration" of the economy of the West Bank with that of Jordan--any more than the large numbers of workers in Israel, marketing a part of the agricultural goods in Israel did not bring about the "integration" of this economy into the Israeli market. In recent years, the increasing bias toward Jordan and other Arab countries is discernible but this is not at the expense of the connection with Israel. Jordan and the Persian Gulf countries absorb mainly skilled manpower and funds that businessmen on the West Bank in the past customarily deposited the capitals.

## Problem of the Grapes from Mount Hebron

While the import and export of goods between the Occupied Territories and Israel have increased in recent years at a sufficiently energetic pace, which kept up with inflation, a very apparent reduction in the imports of goods from Jordan has taken place (imports over the bridges last year made up only about 1.5 percent of the total imports into this region). Nor is the export by way of the bridges developing, and in real prices is even decreasing. In contrast to exports of 343 million Israel pounds by way of the bridges in the year 1976, this export of last year totaled 1.1 billion Israel pounds--a sum similar to the export (at current prices) by this means in the previous year. Export by way of the bridges today makes up about one-third of the total export of the Occupied Territories.

Even the makeup of the goods moving by truck over the Jordan River bridges has changed decidedly since the summer of 1967. They are no longer carrying mainly cucumbers and tomatoes, cantaloupes and watermelon. More than half of the agricultural export are citrus fruits from the Gaza Strip. Similarly, there is a demand for fresh grapes from the hills of Hebron. There are no longer agricultural surpluses in Judea and Samaria. The residents, whose standard of living has risen, are absorbing increasing quantities--and even Israeli agriculture has adapted itself to the marketing of the produce of the Territories. Only the late-ripening grapes of Mount Hebron cause specific problems, since they arrive at the Israel market when there is a glut of grapes there. A recent study at the Vulcany Institute raised the possibility of sending certain quantities of these grapes to England and Germany for the Christmas holiday period.

Another solution to the matter of surpluses which occupied the advocates of the concept of the "open bridges" in 1967, is the development crops intended for export to Europe. Jordan Valley farmers learned from their Israeli neighbors there to grow winter vegetables--particulatly eggplant, which fetch high prices in the European market. The growing of several strains of onion intended for the European market was also very successful.

Upon completion of development of the O'or Valley, which is irrigated by the waters of the Yarmokh River, demand in Jordan for fruits and vegetables from the East Bank will drop even more. Except that the farmers who learned from their Israeli trainers how to grow vegetables under plastic sheets, how to utilize modern equipment, systems of sowing cycles and past control--are the very ones who in the future will be called upon to traverse the Jordan River and to integrate with the intensive agriculture which is going to develop in the eastern Jordan Valley.

In the industrial export over the bridges, the main product is perfume made from palm-tree oil which is brought in through Aqaba, olive-oil, soap and stones from the Hebron region (which are sold in part cut and in part even polished). The stone manufacture resulted in the founding in recent years of a chain of enterprises replete with improved equipment which stand abreast along the length of the Jerusalem-Hebron road. However, in general the development of industry of Judea and Samaria is not on a par with that of agriculture in the region: here new technologies were not acquired. The progress is slow, and in several areas even nonexistent.

What, then, is the source of the unprecedented expansion that is felt these days in Judea and Samaria? Undoubtedly, it stems in part from the incomes of the workers of the West Bank in Israel, and in part--almost certainly the larger part--from the transfer of funds from the residents of the Territories who work in the Arab countries. It is difficult to measure these transfers inasmuch as the transfer is done by means of the Jordanian banks, where many of the residents of Judea and Samaria maintain their active accounts.

Thirteen years after their opening to traffic following the Six-Day War, the Jordan bridges serve mainly for the movement of persons. About 1 million people, half a million in each direction, will pass over them this year. While, during the years immediately subsequent to the Six-Day War, the number of incoming was greater than the number of outgoing, since the year 1974 the balance is negative and points to a 15,000-17,000 person exodus annually over the number of entrants (in which figure is included also the traffic through the Ben-Gurion Airport). The consensus is that the tempo of the "brain drain"--exodus of professionals, entrepreneurs and skilled workers--will be on the increase in the years to come.

How does this trend dovetail with the construction movement which is also felt in Judea and Samaria? Does the "mind migration" signal a waiving on the part of Arabs of their efforts to set up a Palestinian state? What will be the economic base of this state, if it is established? On this, in the next article of the series.

8090
CSO: 4805

## AFFORDABLE HOUSING FOR HAIFA ARABS

Tel Aviv DAVAR in Hebrew 16 Sep 80 p 6

[Article by Yosef Mikhaelsky: "An Arab Ghetto in Haifa?"]

[Text] "Problems of urban and national dimension are anticipated regarding the issue of housing for the Arabs of Haifa. If there are no changes for the better in the present situation, the Arabs of Haifa will find themselves facing an inability to arrive at dwelling solutions and strong pressure will be created on the existing area." This conclusion is the outcome of the study by Yosef ben-Artzi of the University of Haifa on the topic "Creation of the Housing Model and Characteristics of the Dwelling Transition of the Haifa Arabs."

The investigator, who examined the dwelling condition and the behavior of the Arab population of the city within the dwellings, attempted to determine, among other things, whether the processes affecting the Arab population of the city indicate the existence of an Arab ghetto similar to the black ghettos in the United States or of other population groups in other countries.

He established that it is not yet possible to define the Arab dwelling sample in Haifa as an ordinary and typical ghetto. On the other hand, it is also impossible to disregard the existence and the intensification of qualitative characteristics of a ghetto in Haifa, which are apt to alter the situation in the future. Many points unify the Arabs of Haifa, yet it appears that despite their existence, the processes through which the people are passing are indicative of processes of segregation in the western world. It is therefore proper to define the model (the character of dwellings and the processes affecting the Haifa Arabs) as an emerging ghetto, although there is complete uncertainty with regard to the direction of its development. External institutional intervention may prevent this and impede the present processes.

Ben-Artzi assumes that the Arabs of Haifa have already spread to all of the neighborhoods of the city where they wish to live. They are not penetrating any new neighborhoods. They aspire to strengthen their consolidation and to preserve the internal connections at their high level. This is one of the reasons for their lack of desire to move to another residential area, far from dense Arab population. Land limitations in Haifa will prevent the spreading and joining of Arab residence, and hostility and suspicion between Jews and Arabs which will prevent joint residence on a large scale will continue.

In the existing situation in the city the pressure will increase for housing solutions and will arouse resentment among citizens who are supposed to enjoy equal rights but who in effect do not receive proper treatment. The resentment will rise from the lower classes to the middle classes and will even affect the leadership. Thus, there will be created a very difficult social ferment. Such ferment may develop into unpleasant situations for the State of Israel and for Israeli society inasmuch as a country which professes to solve the housing problems of its residents cannot justify turning away from problems of housing for a portion of its residents, the portion which will associate its ferment with political consequences.

"While we view the social outbreaks in the black ghettos in the U.S., in the ghettos of British cities, and are reminded of the outbreaks of Wadi Salim, there is developing among us a component of inhabitants whose housing alternatives are becoming ever fewer. There is no attention given to these problems, and the resentment of the component will increase," Ben-Artzi writes and stresses, that in order to prevent the possible development of social and political ferment against the background of a housing crisis, the Government of Israel should give its attention to the creation of housing alternatives for the Arabs of Haifa. In his view the possibilities are: rehabilitation and renovation of the existing Arab concentrations in Wadi Nisnass, in the lower city and the Karmel Station, as well as new construction in open zones on the edges of the "existing geographical concentrations."

In the summary, the author of the study writes: "We are not able to propose, for example, the transfer of Arab population to a 'development city' in the Galilee or to other neighborhoods within the city [of Haifa] in view of the findings of the study that revealed ties, strong ones, among the minority, between it and the neighborhood in which it is living, and the strong desire of the residents to remain together. It was therefore recommended to build and develop within the concentrations and adjacent to them, in order to attract an Arab population there and prevent problems which are likely to develop if the present processes and trends continue. There are in Haifa possibilities for creating alternative solutions and these should be planned against a background of findings of the kind that this study has brought to light, and it is in that manner that its implementation section also addresses itself."

8090
CSO: 4805

## STUDY REVEALS EXISTENCE OF TRAINED MANPOWER BASE

Paris L'AFRIQUE ET L'ASIE MODERNES in French Third Quarter 1980 pp 40-49

[Text] Wedged in the midst of a region which for 30 years has experienced uninterrupted agitation, Jordan has been subjected to the consequences of all the political and economic upheavals which could occur in the Middle East. In fact, ever since its inception, it has been faced with the Palestinian problem and has been obliged, for reasons of solidarity with the Arab community, to line itself up on the side of the nations participating directly in the struggle against Israel. This attitude has brought it many disappointments, namely, loss of the West Bank in 1967, violent confrontation with the Palestinians in 1970 and 1971 and partition of its territory as a result of the war of October 1973. In fact, the Israeli-Arab conflict has doubly penalized Jordan at the very moment that it was making every effort to achieve an economic boom:

(1) By losing the West Bank, Jordan was deprived of the richest portion of its territory. (Forty-five percent of its gross national product came from this region).

(2) The successive wars brought onto its territory a considerable influx of Palestinian refugees (nearly 300,000) who thus added themselves to a population that was already quite underprivileged.

Such a tax paid to the Arab cause could have appeared insurmountable to a little country with limited natural resources. Nevertheless, due to its political stability and a very capable diplomacy, Jordan succeeded in recovering and bringing together all the elements of a new economic policy.

Taking advantage of the aid furnished by the petroleum producing nations, Jordan gradually built up economic organizations that were suited to its actual means, while succeeding in attracting to its capital city the business men and companies that, since 1976, had been fleeing the territory of Lebanon which has been plagued by civil war.

Prince Hassan, brother of the King of Jordan, heir to its throne, and responsible for the economy of his country, addressing the United Nations Conference on Scientific and Technical Development in August 1979, made the following remarks with regard to Jordanian manpower: "Like many other developing countries, Jordan is a nation which exports skilled labor to work for the third world countries but also for other nations of the world. This movement of manpower has been beneficial to both donating and receiving parties. However, it is now producing negative results for Jordan, namely, the brain drain. The latter imposes considerable economic loss for the countries that export manpower. It decreases their scientific and technical potential. It is important to find remedies; however, these should be stretched out over a more or less lengthy period, since an abrupt cessation of migration to the Middle East would produce fatal consequences both to the countries exporting manpower and to those importing it."

This short quotation constitutes a good summary of the exceptional situation of Jordan in the extraordinary current of human migration which traditionally characterizes the Middle East.

Deprived of raw materials, but abounding in an active population whose skills continue to improve, Jordan occupies a privileged position, particularly with regard to the petroleum producing nations. In fact, the latter, which are immensely rich, are generally underpopulated and consequently incapable of implementing their developmental policies without resorting to imported manpower.

Jordanians, who are present in nearly every country of the Middle East, occupy many specialized posts and thus participate actively in the formidable economic boom now being experienced by the Arab world.

It is true that, in order to carry on this difficult struggle, Jordan disposes of an important trump card--its skilled manpower. In a region dominated by nations which are immensely rich but also underpopulated, such a weapon possesses an inestimable value. The Jordanians have understood this very well. This is why they have made every effort to benefit as much as possible from this situation.

## Resourcefulness of the National Labor Force

The population of Jordan is now estimated to be nearly 3 million inhabitants. Its growth rate is 3.4 percent annually, 56 percent of the total population being under 20 years of age.

The nomads and seminomads constitute no more than 5.6 percent of this population since urbanization continues its upward trend. In fact, population centers of more than 5,000 inhabitants account for nearly 50 percent of Jordanian citizens. (Amman has about 700,000 inhabitants, Zarqa 220,000, Irbid 80,000 and Aqaba 20,000).

To be sure, as is the case with most Arab countries, it is difficult to obtain complete official statistics. Nevertheless, the tables displayed below furnish a good idea of the general structure of the Jordanian population.

(2 million workers in 1950. Source of data in tables: "Asia," second edition, 1977, volume 1, published by International Labor Organization, Geneva.

N.B.: These tables do not include those Palestinians who are not Jordanian citizens.

## Table 1. Estimate of the Population and Labor Force From 1950 to 1970 by Sex (in thousands)

| | Number of inhabitants | Percent of inhabitants working | Number of workers | Men | Percent | Number of workers | Women | Percent | Number of workers |
|---|---|---|---|---|---|---|---|---|---|
| 1950 | 1237 | 25.46 | 315 | 642 | 46.12 | 300 | 595 | 2.53 | 15 |
| 1955 | 1447 | 25.34 | 367 | 751 | 46.41 | 348 | 696 | 2.63 | 18 |
| 1960 | 1695 | 25.52 | 433 | 879 | 46.70 | 410 | 816 | 2.71 | 22 |
| 1965 | 1955 | 25.19 | 492 | 1008 | 46.21 | 466 | 947 | 2.80 | 26 |
| 1970 | 2280 | 24.80 | 565 | 1171 | 45.56 | 534 | 1109 | 2.87 | 32 |

## Table 2. Estimate of the Labor Force in Agriculture, Business and Services From 1950 to 1970 (in thousands)

| | Total Population | | | Men | | | Women | | |
|---|---|---|---|---|---|---|---|---|---|
| | Agriculture | Industry | Services | Agriculture | Industry | Services | Agriculture | Industry | Services |
| 1950 | 165 | 68 | 82 | 157 | 65 | 78 | 8 | 3 | 4 |
| 1960 | 190 | 114 | 129 | 182 | 109 | 120 | 8 | 5 | 9 |
| 1970 | 191 | 186 | 189 | 183 | 177 | 173 | 8 | 8 | 16 |
| | | | | | (in percent) | | | | |
| 1950 | 52.3 | 21.5 | 26.1 | 52.3 | 21.7 | 26.0 | 52.5 | 17.8 | 29.6 |
| 1960 | 43.8 | 26.3 | 29.8 | 44.3 | 26.4 | 29.2 | 35.9 | 24.0 | 40.1 |
| 1970 | 33.7 | 32.8 | 33.4 | 34.2 | 33.2 | 32.4 | 25.0 | 26.0 | 48.9 |

## Table 3. Projections of the Population and Labor Force by Sex From 1975 to 2000 (in thousands)

| | Total Population | | | Men | | | Women | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Number of inhabitants working | Number of workers | | Number of inhabitants working | Number of workers | | Number of inhabitants working | Number of workers |
| 1975 | 2688 | 24.24 | 652 | 1377 | 44.4 | 612 | 1311 | 3.1 | 39 |
| 1980 | 3177 | 23.80 | 756 | 1624 | 43.5 | 707 | 1553 | 3.1 | 49 |
| 1990 | 4397 | 23.79 | 1046 | 1915 | 43.1 | 826 | 1837 | 3.4 | 63 |
| 1985 | 3752 | 23.68 | 888 | 2241 | 43.2 | 967 | 2156 | 3.6 | 79 |
| 2000 | 5889 | 24.74 | 1457 | 2998 | 44.5 | 1336 | 2891 | 4.2 | 121 |

[Table 3 as published]

As in many other areas, 1973 was an important date with regard to the employment situation in Jordan. Between 1960 and 1973, due to an uncertain economic policy, Jordan had an excess of workers. There was an overabundance of skilled labor and the unemployment rate was high. Furthermore, as we have pointed out, the sudden arrival of several hundred thousands of Palestinian refugees in 1967 had totally destabilized the national economy. Following the October 1973 crisis, due to the quadrupling of the price of petroleum, the Gulf nations were able to embark on vast development programs. Since they now lacked sufficient labor, they were forced to solicit foreign workers.

Jordan, a fellow Arab nation, and being located close to the countries needing its services, has been able to seize upon this occasion to export its surplus skilled workers. The latter, attracted by salaries three or four times those prevailing in their home country, were not long in migrating in a body. It is estimated that, between 1974 and 1977, more than 20,000 Jordanians emigrated each year to the Gulf countries. It appears that this exodus has slowed down somewhat during the last 2 years and has stabilized at a rate of 10,000 departures per year. By 1979, out of a working population of nearly 600,000 persons, it was generally admitted that more than half had left Jordan to go and work abroad. The distribution of migrants at that time was as follows:

| | |
|---|---|
| 125,000 | Saudi Arabia |
| 75,000 | Gulf Emirates |
| 50,000 | Kuwait |
| 20,000 | Libya |
| 30,000 | Europe |
| 36,000 | North and South America |

Such an exodus could not be tolerated by the Jordanian economy since it is true that no nation can assure its own development with less than 50 percent of its skilled human resources. Courageously, the Jordanian authorities studied the problem, considering both the causes and consequences of such a situation.

## Jordanian Reaction on the Emigration of the Labor Force

In 1976, the Jordanian government began to seek solutions for the problem of decreasing the number of departures of workers to foreign lands. Paradoxically, Jordan, up to then a traditional reservoir of manpower, found itself obliged to issue an appeal for foreign workers. In fact, by that time, there were already more than 50,000 immigrants filling jobs in the Jordanian economy. These included nearly 30,000 Egyptians, 5,000 Koreans, 8,000 Pakistanis, etc.

Many long, detailed investigations were then conducted throughout the country. They were aimed at answering a number of key questions: What were the reasons that motivated the Jordanian workers to leave the country? Exactly how many of them were there abroad? What were the consequences of such an exodus of manpower on the national economy? How many foreign workers would have to be imported? What were the measures to be taken to keep Jordanian workers from leaving their homeland?

Not all of the answers have as yet appeared clearly, but the Jordanian authorities have not waited for this to implement a series of measures which have begun to bear fruit. The differences between the prevailing wages in the petroleum exporting nations or in the Western countries from those in Jordan constituted the only essential reason for the exodus of the Jordan workers, whether skilled or not. Therefore, the Jordanian government began to appreciably increase the salaries of its workers beginning in 1977. However, this increase immediately produced a rise in production costs, thus placing a heavy burden on domestic businesses which thus lost their competitiveness.

Realizing that they could not catch up with the salaries prevailing abroad, the Jordanian authorities then concentrated on improving the social conditions of their workers, creating a better school system for children than was offered by the countries to which Jordanians had emigrated, generally improving national insurance benefits (health, family, etc) as well as increasing the number and powers of trade unions.

Other measures were also studied for the purpose of helping to keep Jordanian workers in their country such as early initiation of a system whereby the workers owned a share of the company, a balanced salary policy and especially the development of a professional training program that was adaptable to the needs of the nation. The last item deserves particular attention. In fact, very early in the game, the Jordanians sought to adapt their worker training programs to the needs of the domestic economy. With the aid of the World Bank, they had created as far back as 1972 a Polytechnic Institute and a professional training center called the "Trade Training Center." The former furnished specialized education in the fields of mechanical engineering, electrical engineering, civil engineering, architecture and chemical engineering while the latter was slanted towards preparing for the construction industry.

Since these two schools rapidly proved to be inadequate due to the low number of students admitted as well as the small number of professions dealt with, they were expanded. Moreover, three other training centers were opened, two of them under the sponsorship of UNWRA and one bearing the name of Vocational Training Center.

Jordanian officials had two things to be concerned with. On the one hand, they had to train the number of experts necessary to satisfy the requirements of Jordan's economy as well as those of the nation which requested skilled manpower. On the other hand, they had to quickly reverse the ratio of four engineers to one technician which then existed in Jordan and which prevented normal operation of their businesses.

Their reasoning led them to the following conclusion. For one high level supervisor who had received his education at a university, the composition of the work force that he required was as follows: 3 or 4 technicians who had received their training at the Polytechnic Institute; 10 to 12 craftsmen, trained at the Vocational Training Center; 32 to 36 skilled workers who were graduates of the Trade Training Center and 48 to 50 unskilled workers.

By imposing such an organizational structure, the officials responsible for reorganizing the job market created a true labor hierarchy with highly specialized categories. Instruction at the level of the Vocational Training Center and the

Polytechnic Institute lasts 2 years. It is free of charge but the students are required to remain at the service of the national economy for a period of 4 years. However, they may buy their way out of their contract by paying the sum of 1600 dinars, which is the equivalent of approximately 24,000 French francs. As for the skilled workers, once they are graduated from the Trade Training Center and have had 2 years of certified experience in their trades, they are given the title of "craftsman."

Actually, all of these measures, which are intended to be more effective in confining the worker to his country, have resulted in being only partially successful since the newly trained technicians sometimes leave the country and "forget" to pay their debts and since some of the less skilled workers do not hesitate to abandon their trade for a better paying one. The Jordanian government as well as the International Labor Office estimate that, in spite of these measures, 40 percent of Jordanian workers leave for the Gulf nations after completing their training.

Defeat or Not?

Jordanian officials do not agree with this view. In fact, they maintain that the free flow of manpower is essential to the observance of human rights and to the national economy. It is true that such a situation is not completely disadvantageous for the following reasons:

It is estimated that 170 million dinars (2.6 million French francs) are returned each year by migrant workers. This results in considerably improving the condition of the nation's finances. Furthermore, the Jordanian economy would be quite incapable of suddenly absorbing the 250,000 to 300,000 workers who are now living abroad. In fact, there essentially exists a shortage of "unskilled" labor in Jordan. Finally and most of all, the migrant workers serve as ambassadors of Jordanian know-how and contribute to the influence of their country while simultaneously acquiring experience and diplomas abroad which will be useful upon their return to their home country.

Moreover, rather than suddenly cutting off these transfers of skilled labor, the Jordanian Government has considered it preferable to try to control them, in order to benefit from them as much as possible. Among the measures taken for keeping better track of the emigrating or immigrating workers, the signing of bilateral agreements with the nations that import or export labor appears to be the most effective. Libya and Pakistan have been the first countries which have been asked by Jordan to do this. The agreements with the Libyan Government provide that the latter will only authorize the admission of workers who have been duly sent by the Jordanian Minister of Labor. This measure was presented by the Jordanian government, not as an attempt to constrain freedom of movement, but as an aid to keeping count of Jordanians working abroad. By the same token, this arrangement permits the Jordanian authorities to prevent the departure of experts as soon as the threat of a shortage within a certain category of employment arises. The agreement concluded with the Pakistani Government essentially permits improving the lot of Pakistani workers who are generally victims of the approximately 900 more or less shady employment agencies that recruit workers in Pakistan for service in Middle Eastern countries.

Encouraged by these preliminary results, the Jordanian authorities are now trying to conclude identical agreements with Iraq, Kuwait, Bahrein, Qatar and the United Arab Emirates. They would even like to organize a conference for assembling the representatives of Arab nations that export manpower, this conference to be sponsored by the Arab Labor Office or the International Labor Office. They believe that such a meeting would permit better organization of the labor market at a regional level, establishment of a labor code for migrant labor (guarantees concerning salaries, social rights, etc.) and development of a system of compensation for the labor exporting nations so that they may recover the expenses incurred in training experts who will then be working abroad.

Moreover, a new breed of official is now appearing in certain Jordanian embassies, namely, the labor attache. These attaches, who are already on the job at Kuwait and Abu Dhabi and are being planned for at Riyad, Tripoli and Bonn (West Germany), are charged with the mission of keeping a watchful eye on the interests of their migrant countrymen.

## The Women's Place

As in other Arab countries, Jordanian women constitute nearly 50 percent of the nation's active force. To be sure, the proportion of women obtaining jobs is still very low. Without seriously attacking time-honored traditions, but determined to promote social progress, Jordan had progressively opened up the job market to females. In 1976, only 4 percent of women were employed. By 1979, this figure had increased to 12 percent. Jordanian authorities now admit that, without the advent of the female sex to the job market, the country would now be suffering from a severe crisis. To be sure, women have not yet received admission to all types of employment. However, in certain specific areas, their numbers have been steadily increasing. By 1979, the percentage of women employed in certain professions had already reached the following levels: 34 percent in bookstores, museums or libraries; 17 percent as dentists; 11 percent as pharmacists and 5 percent as physicians. In the area of skilled labor, 55 percent of secretaries and 60 percent of clothing workers were women.

The Jordanian women have therefore indeed found their place in the national economy. Fifty percent of the youth below the age of 24 consists of girls. This group constitutes a labor force that is less likely to be tempted to go abroad and is therefore more stable. The problem lies in the lack of willingness displayed by the government to absorb women into their organization. Only the private sector is opening up, although it is still doing this slowly. This is insufficient to change the present employment situation significantly.

Conscious that it must control the changes in the skilled manpower situation, Jordan appears to be the driving force in the regional dialogue that brings together all the nations that are concerned with employment problems. By the lucidity of its analyses and the candor of its conclusions, it presents itself as the responsible leader whose principal concern is the search for reasonable and consequently effective solutions. The rank that it holds in the skilled labor market, the care imparted to the training of its technicians, even if these are destined to expatriation, and the reasonable opening up of the job market to women make Jordan a pilot nation. More and more people, Arabs and non-Arabs, are entering into discussions with representatives of the Jordanian Government. Together, they are trying to lay the foundations of a close cooperative effort which should make it possible to overcome a crisis whose seriousness is obvious to everyone.

If the political events which are shaking up the Middle East so dramatically do not once again manage to sweep away all the efforts of the Jordanian government, the latter, with its skilled manpower, will hold the key to true wealth in this region.

7619
CSO: 4800

## ELECTIONS PUT OFF UNTIL GULF WAR ENDS

Paris AN-NAHAR ARAB REPORT & MEMO in English 17 Nov 80 p 5

[Text]

The Gulf war has brought sleepless nights for Kuwaiti leaders and their nervousness was increased sharply last week when an unidentified aircraft fired two rockets at the Kuwaiti border post at Abdali. The attack caused no damage or casualties on the gound, but it sent tremors through world foreign exchange markets, boosting an already strengthening dollar as Gulf money sought a haven.

Another casualty in the war is likely to be the parliamentary elections planned for the beginning of next year in Kuwait. A correspondent reports that these elections have been postponed until the end of the war and a return to normal conditions in the Gulf.

*Our correspondent writes*

The Kuwaiti government has said nothing so far about putting off the elections, but officials have suspended preparatory work for the poll. The move did not really come as a surprise: even without the war between Iraq and Iran, there were plenty of reasons why there is likely to be continuing tension in the Gulf. They include the likelihood that US foreign policy during Ronald Reagan's Presidency will be characterised by deterioration in relations with the Soviet Union; coupled with the Soviet presence in Afghanistan, South Yemen and Ethiopia and the revolution in Iran, this worsening of relations seems bound to add up to continuing tension for Gulf states.

As a substitute for the elections and in order to placate opposition to their postponement, Kuwait's Deputy Prime Minister Sheikh Jaber al-Ali al-Salem al-Sabbah has proposed the creation of an appointed Council of Sages, bringing together political and cultural leaders as well as tribal and trades union leaders. The council would have consultative and legislative powers, although its precise jurisdiction has not been spelled out.

A final decision on postponing the elections and the appointment of a council is expected within the next few weeks. If the war is ended quickly, elections will be held. Otherwise, uncertainty hangs over a return to parliamentary rule in Kuwait.

CSO: 4820

# VERDICT GIVEN IN NEWSPAPER BOMBING

## Two Convicted

Kuwait KUWAIT TIMES in English 16 Nov 80 p 1

[Article by Zakaria Al Qaq]

[Text] **THE State Security Court, delivering its verdict in the Al Rai Al Aam explosion case yesterday, sentenced one of the accused to death and another to life imprisonment with hard labour.**

A third accused was pronounced not guilty. The three were charged with murder and possessing explosives.

The man condemned to death, Rouhi Ibrahim Abdul Latif, 23, worked as a guard at the office of Al Fatah commando group here.

He was found guilty of planting explosives in the printing press of Al Rai Al Aam newspaper, which killed two people, injured 18 others and destroyed the press on July 12.

The third accused, Jihad Mezyid Amin, 36, a major in Al Fatah commando group, was found innocent by the court.

### *CONSCIENCE*

After reviewing the statements of the prosecution, the text of the investigations and the medical reports about alleged use of force against Rouhi the court, said it was guided by conscience in giving more weight to a particular set of evidence than to another.

### *SISTER*

The defence plea that confessions made by during the investigations were invalid because these were extracted under duress were not accepted by the court on the ground that all evidence indicated that Rouhi knew what he was doing when he made the confessions.

Besides, he had given minute details of the operation.

At one time Rouhi said he was intimated by the police, and at another he said he was afraid of the general prosecutor.

He then reversed his statements and said he had confessed as a result of threats made against his sister.

In its judgment, the court held that the second accused Wayil Abdul Latif, played a limited role and his confession of the crime help the CID in its investigations.

The court therefore took a lenient view according to the Kuwaiti law, and sentenced him to life imprisonment.

All three men are Jordanian nationals.

## One Acquitted

Kuwait KUWAIT TIMES in English 16 Nov 80 p 1

[Text] **JIHAD Mesyid Amin (right) the third accused, was released as the court found the evidence against him to be dubious. Amin, 36, has the rank of a major in Al Fatah commando group.**

**The court took note of the CID Inspector's statement that he had no information if the third accused had instigated others to commit the crime and that he had no further investigations to conduct in this matter.**

**The court, therefore, gave the accused benefit of doubt and released him.**

## Publisher's Testimony

Kuwait KUWAIT TIMES in English 16 Nov 80 p 5

[Text] **THE Rai Al Aam blast which caused the death of two press workers on July 12, was instigated by Iran, according to the newspaper's publisher Abdul Aziz Al Masaeed.**

In his testimony before the court, which was disclosed yesterday, he said that he had realiable information in March and May that "an organisation which had strong ties with Iran" was being instigated to blow up the press or to kill him.

He told the court Iran was enraged by his newspaper's stand in denouncing demonstrations by Kuwaiti Iranians. He recalled that the paper had called upon the Kuwait government to strip unpatriotic people of their Kuwaiti nationality.

Al Masa'eed's testimony was recorded in camera shortly before the trial of three men accused in the case was completed last month.

One of the accused was given the death sentence when judgment was passed yesterday. Another was given life term and hard labour while the third walked out of court a free man. (See story on page one)

Al Masaeed said the source that gave him the plot against the press did not name the organisation but he could make his own conclusions.

### EDITION

Al Masa'eed said believed that it could be the Palestinian Al Fatah organisation as it had strong links with the revolutionary regime in Iran and was engaged in battles in Southern Lebanon predominanty populated by Shi'ites.

"Only Khomeini and his government could protect the organisation from these Lebanese Shi'ites," Aziz Al Masa'eed said.

He also held that the Iranian government had grudges against Kuwait for its decision to withdraw the nationality from Al Mubri family which had been deported from Kuwait on charges of sowing seeds of sedition through speeches in mosques against the government.

"In my opinion, there are common interests between the Iranian government and Al Fatah organisation," Al Masa'eed asserted. He ruled out the possibility that the incident could have been prompted by the Muslim Brotherhood of Syria or by the Phalangists of Lebanon. He also said he could not accept the plea given by the second accused to the effect that they had blown up the paper merely to kill one of the workers. "He who wants to kill a man does not blow up the whole place for that," he said.

He affirmed that the paper followed a purely Kuwaiti policy. "We are not tilted towards Egypt, Syria or any other regume for that matter," he said. "Egypt in particular cannot be involved as it has no record of violent political activity in Beirut and has never been engaged in blast incidents or circulating leaflets," he added.

Aziz Al Masa'eed also categorically denied that the Beirut-based Al Amal Organisation, could be involved, contrary to what was mentioned in the cable received from the Kuwaiti Embassy in Beirut. He said that from what he knew about that organisation he felt quite sure that it was incapable of planning or carrying out the blast. "I am also on good terms with a government that deals with that organisation," he said. "I could have been tipped off if the organisation was planning anything against me or my paper," he said.

He also denied that the Libyan Cultural Attache in Kuwait was providing him with material against Imam Al Musa Sadr with a view to maligning the Imam. He said that the publication of an alleged message from Imam Al Sadr could not have supplied enough motive for a crime like this.

It may be mentioned that during investigation, the CID had revealed that the incident had a political motive and that there was a link between the accused and the Palestinian Fatah organisation. The CID were inclined to believe that a certain political organisation had used the defendants to carry out the blast crime offering them money.

Earlier, a cable received by Kuwait's Foreign Ministry from the Kuwait Ambassador in Beirut had warned that an organisation affiliated to "Al-Amal" was planning to blow up the Al Rai Al Aam newspaper because of articles abusing the Shi'ite Imam Al Sadr. The cable also mentioned that the Libyan Cultural Attache in Kuwait was the source of the Al Rai Al Aam publisher in his writings against Imam Al Sadr.

Al Masa'eed supported the affirmation of his father, Aziz Al Masa'eed that Fatah organisation planned and carried out the explosion.

The Press Manager testified that the paper had carried an article attacking Muslim Brothers.

The General Manager said in his statement that the paper was following a nationalist policy and took a firm stand against Camp David and the Phalangists of Lebanon.

CSO: 4820

# KIC SEEN AS MOST ACTIVE ARAB BOND COMPANY

Kuwait KUWAIT TIMES in English 15 Nov 80 p 2

[Article by John Evans]

[Text]

**LONDON, Fri. — The big financial group, Kuwait Investment Company (KIC), has established itself as the most active Arab institution in the $15 billion-a-year international bond market.**

In the first nine months of 1980, KIC arranged a total of three international bonds or notes, totalling $104.5 million, for its customers.

This placed it 32nd in world rankings, with a 0.9 per cent share of the international bond markets, a survey of the markets by the influential British financial magazine, Euromoney disclosed today

By contrast, the top ranking bank in the international bond markets is West Germany's powerful Deutsche Bank, which gained a 12.8 per cent share of the market. It led 22 bond issues totalling $1.3 billion in the period

The Euromoney survey is based on all currencies used in inter-national bond investment, and restricted to banks which act as sole lead managers or joint lead managers of issues.

## SIXTH RANK

KIC in fact performed even more notably in one currency sector that for French francs. It was the sixth most active institution in French bond issues, managing one bond of 133.3 million francs.

Western bankers consider the heightened activity of Arab banks in the international investment and capital markets to be one of the most significant trends of the last couple of years, considering it a key Mid-East contribution to world financial stability through the re-distribution of surplus oil export earnings back into the international economy.

Last year, the most active Arab banks in the bond markets were Kuwait Foreign Trading, Contracting and Investment Co, with three issues, and the Kuwait International Investment Company, with six issues.

Those institutions remain extremely active in the bond markets, but do not show highly on the Euromoney "League tables" because of the way in which the statistics are compiled

For example, Kuwait International Investment Co has managed issues so far this year in the Eurocurrency investment markets totalling about $1.5 billion, including floatations for Swedish, Hungarian, British, Japanese, Canadian and Arab borrowers.

## RANGE

The range of the currencies it managed included US dollars Kuwaiti dinars, Canadian dollars and special drawing rights — the international currency "basket."

In dividing up the bond markets into sectors, KIC recorded 18th place in the flat-rate note division, managing one issue totalling $50 million. The leader of this section was France's Societe Generale, with two issues totalling $400 million.

Meanwhile, the Kuwaiti dinar sector of the international bond markets has declined this year, partly because of the economic upheavals around the world.

According to Euromoney, only one KD issue was floated in the January-September period, bringing down the Kuwaiti currency's share of the bond markets to 0.2 per cent compared with 2.6 per cent last year.

In the first nine months of the year, a total of new issues amounting to $13.6 billion was floated around the world, in all currencies.

Euromoney also publishes tables showing the most active banks arranging international syndicated loans.

CSO: 4820

## BRIEFS

MALDIVE LOAN--A loan agreement was signed yesterday between the Republic of Maldives and Kuwait Fund for Arab Economic Development (KFAED) whereby the Fund will make a loan of KD 2.9 million to help finance the fish-wealth exploitation project. The loan agreement was signed on behalf of the Republic of Maldives by Abdul Sattar Amir, minister of fisheries. Abdul Rahman Salem Al Ateeqi, chairman of Kuwait Fund board of directors and the minister of finance, signed on behalf of the Fund. The project aims at increasing the production of fish for the purpose of export, a matter which will increase the foreign currency earnings of Maldives. Total cost of the project is estimated at KD 4 million of which 73 per cent is covered by the Fund. The loan will be for a period of 20 years including 5 years period of grace, and will be amortised in 30 semi annual instalments the first of which will fall due on 15.12. 1985 and the last on 15.6.2000. [Text] [Kuwait KUWAIT TIMES in English 6 Nov 80 p 2]

JAPAN AIR LINE LOAN--Kuwait International Investment Company (KIIC) will lead in a US $40 million international issue for Japan Air Lines (JAL), a company statement said yesterday. The loan will be at 8.8 per cent interest payable half yearly, and the issue will be guaranteed by Japan Industrial Bank, it will fall due in 1990. A number of Arab and international banks will colead in the issue which will be registered at Luxembourg stock exchange. This is the first time that an Arab financial institution leads in a public issue in favour of a Japanese borrower, the statement added. KUNA [Text] [Kuwait KUWAIT TIMES in English 6 Nov 80 p 2]

LABOR STATISTICS--Over 7000 establishments in Kuwait were inspected by representatives of the Ministry of Social Affairs and Labour during 1977, a report said last Sunday. During the periodical checks over 5000 contraventions of labour legislations were spotted by inspectors who were assigned for the purpose. The establishments employed over 19,000 labourers and contraventions were estimated at 75%. In another drive which covered 6,000 establishments employing over 10,000 workers, the per centage dropped to 73%, the report said. Contraventions included excessive working hours, wages and wrongly imposed penalties on workers. Only 1,657 establishments comprising 27% of industrial employers were found to be adhering strictly to labour laws, the report said. A total of 3,495 contraventions were sent to courts and some 4,000 warnings were made to industrial establishments, the report said. The inspection is part of a plan for the protection of the labour force and to ensure the application of Labour legislations and proper employment of women and children. The programme is to ensure labour safety and that wages are paid in accordance with current legislations. The plan which came into force in 1977 is gradually expanded to cover all industrial establishments and was recently expanded to include schools, banks, airline firms and cooperative societies. The service is also applied in non-government hospitals, kindergartens and pharmacies. [Text] [Beirut THE ARAB WORLD WEEKLY in English 15 Nov 80 pp 18-19]

BOMB DEFUSED--Bomb experts went to the premises of the Social Reform Society and safely defused a bomb which had been found on the premises yesterday evening, the Chief of Security in Hawalli governorate said. [Text] [Kuwait KUWAIT TIMES in English 18 Nov 80 p 1]

SEA FRONT PROJECT--Kuwait Municipality concluded a contract for the implementation of a KD 120-million project for the improvement of the sea front. The project extending from Shuwaikh to Salmiyah will be executed in six phases under the supervision of an international consultancy firm. The project will include the construction of recreational sites and social centres in addition to an open theatre and a yachting harbour. The final stage of the project will involve the preparation of sand beaches, cafaterias, restaurants and a series of gardens. KUNA [Text] [Kuwait KUWAIT TIMES in English 8 Nov 80 p 3]

EMERGENCY SHELTERS--The Ministry of Public Health will soon put up signs indicating the location of emergency shelters. The shelters, mainly in government buildings, schools and police stations, are aimed at the safety of people in case of emergencies. Official sources said the plan had been contemplated since quite some time and the current tense situation in the region had prompted the authorities to speed up the process. The move is the first one in a series of plans aimed at civil defence. [Text] [Kuwait KUWAIT TIMES in English 8 Nov 80 p 3]

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## BRIEFS

COUNCIL APPROVES 1980 BUDGET--The Ministerial Council met yesterday under the chairmanship of Lt Col Mohamed Khouna Ould Haydala, president of the Military Committee of National Salvation and head of state and government. During this meeting, the council examined and approved the budget for the 1980 [as heard] fiscal year. The budget, which is balanced and totals 10.4 billion ouguiya is characterized by austerity and discipline in revenue collection and expenditure estimates in conformity with the military committee of national salvation's directives. Thus, the budget deficit, which was 5.49 billion ouguiya in 1978 has been reduced to 2.21 billion ouguiya. Special emphasis was placed on rural development fishing and the marine economy by extending large credits to the regional development fund and to the fishing development and territorial water surveillance fund. Finally, tax relief was granted to the low income group and a salary increase was granted to civil servants who earn less than 15,000 ouguiya. [Text] [AB091558 Nouakchott Domestic Service in French 1400 GMT 9 Dec 80]

CSO: 4400

## KUWAIT TO BECOME 'FAVORED PORT' IN AREA

Kuwait KUWAIT TIMES in English 14 Nov 80 p 2

[Article by John Evans: "Kuwait Poised To Be Key Gulf Shipping Centre"]

[Text]

**LONDON, Thurs. — Kuwait is poised for a potentially massive expansion as a shipping and transporting centre, and is increasingly becoming the favoured Gulf port of many big international shipping lines.**

This is the conclusion of a Kuna survey among western shipping, freighting and transporting organisations, as they re-evaluate the Gulf area's trading prospects in the wake of the Iraqi-Iranian war

The wide-ranging reconstruction requirements in Iraq and Iran as a result of war damage, requiring huge amounts of concrete, structural steel and many other imported items, points to a central role for Kuwait as developing its role as a key Gulf transhipment centre, the survey of western expectations shows.

Iran alone is estimated to need to spend some $20 billion in re-constructing its oil installations, particularly the big Abadan complex.

Kuwait has already felt the impact of the conflict, as foreign shippers diverted their Iran or Iraq-bound cargoes to Kuwaiti ports. Goods have piled up on the Kuwaiti docksides.

### *UPTURN*

In the event that hostilities cease, Kuwait with its key land links with Iraq and Iran — will be in the centre of an international scramble to ship re-construction materials and goods in, particularly to Iraq, western shipping and business analysts say.

In fact, the whole of Kuwait and its economy will undoubtedly be affected by the reconstruction "boom" and the oil state will itself undergo a brisk business upturn, according to western analysts. Additionally, plans for railway links with Iraq and Kuwait's other neighbours may well have to be advanced for the huge volume of transhipment forecast.

"We can see Kuwait for an indefinite period becoming the key Arab port in the Gulf," says one European shipping line.

The view in Europe is that Iraq's own big ports complex, Basrah, will not be able to handle the huge influx of materials necessitated by re-construction. In recent years, Basrah has been stretched to handle Iraq's own normal imports, and lengthy delays and congestion have often been experienced.

The Iranian port of Khorramshahr is now felt in the west to be very vulnerable, with Iran turning to its Gulf ports as alternatives.

The eventual sovereignty issue of the Shatt-Al-Arab, which Iraq is now claiming, raises grave question marks over the future of Khorramshahr, western analysts say.

### *INFRASTRUCTURE*

The port of Bandar Abbas, right on the mouth of the Gulf and Bandar Khomeini, are seen as the two main Iranian shipping centres in coming years. But Chabahar, right on Iran's border with Pakistan, may also be built up, analysts say.

But such expansion, requiring back-up infrastructure, such as good road and rail links, could be hampered in the initial phase.

Other Gulf ports, as well as Kuwait, may share in the Iraqi-Iran reconstruction upturn.

But Dubai could face setbacks once the war ceases and if Iran releases the US hostages and reaches an agreement with America.

Says one Western analyst, "It is an open secret that Dubai is used as a transshipment centre for embargoed goods into Iran, in order to overcome the Western trade boycotts against Iran."

He added, "when and if the embargo is dropped, lower Gulf ports could stand to lose a lot of useful trade.".

But Western shippers do confess to some worries over whether Kuwait can easily accommodate a two, three or even four-fold increase in traffic through its ports complex, as business builds up.

One of the most pressing needs, they consider, is to build up Kuwait's facilities for container traffic, centred on the requirement of large container cranes.

CSO: 4820

## BRIEFS

GROWTH OF FERTILIZER INDUSTRY--The Gulf Arab states will be able to export one million tons of ammonia and two million tons of urea fertilisers by the end of the decade, according to a special bulletin of the Arab Federation of Chemical Fertiliser Products. The availability of the natural gas as the basic raw material in the fertiliser industry will allow the Gulf states to be competitive in the world market, said the bulletin. The industry was first started during the mid-1960s in Kuwait with two plants for ammonia and urea. At present, $3.4 bn have already been invested in fertiliser industries in the region and indications are that the figure will rise by the end of the decade to $5.5 billion. New fertiliser industries still under construction in the Gulf, will increase the present annual capacity of 2.4 mn tons of ammonia and 3.4 mn of urea to almost double by the mid-1980s. A surplus, intended for exports, is expected before the end of the decade. To secure and develop the industry, the Gulf states are now heading towards joint projects. Examples are the Saudi venture with Bahrain and Kuwait for the production of Ammonia, while others are between Tunisia, Kuwait and the United Arab Emirates. [Text] [Beirut THE ARAB WORLD WEEKLY in English 15 Nov 80 p 17]

CSO: 4820

## BRIEFS

STATE BUDGET UP--Allocations for major public projects in the new Qatari budget are about 20 per cent higher than last year and total about QR 6 billion ($1.65 billion), it was announced last week. Although this sector continues to receive the lion's share of public spending, it is relatively less important than in earlier years, since the budget total has jumped by 34 per cent, from QR 6.7 billion ($1.8 billion) in 1979-80 to about QR 9 billion ($2.5 billion) in the fiscal year beginning on November 8. Announcing the new budget last week, Finance and Petroleum Minister Sheikh Abdulaziz bin Khalifa al-Thani said that about half the money allocated for major projects would be spent on industrial, agricultural and petrochemical ventures. Industrial development alone accounted for 36 per cent of the sums earmarked last year. No details of spending under the new budget are yet available. [Text] [Paris AN-NAHAR ARAB REPORT & MEMO in English 24 Nov 80 p 6]

REFINERY CONTRACT--Qatar's General Petroleum Company, which runs the state's oil and gas industry, has awarded a $140 million contract to the French firm Technip for a turnkey oil refinery with a capacity of 50,000 barrels a day, it was announced last week. The plant will be located at Umm Said, south of Doha, where Qatar's existing refineries are situated. Refining capacity at present is about 55,000 b/d for crude. Technip, which is believed to have beaten off fierce competition to win the order, won a similar contract three years ago to participate in the Umm Said petrochemicals complex. THe firm was responsible for an ethylene plant producing 280,000 tonnes a year, which is due to become fully operational about now. Qatar's crude production is about 500,000 b/d, much of which is exported to France. The new refinery will process oil produced onshore and will include storage facilities for intermediate and refined products. [Text] [Paris AN-NAHAR ARAB REPORT & MEMO in English 24 Nov 80 p 6]

CSO: 4820

## RESEARCH DEEMED ESSENTIAL FOR AGRICULTURAL DEVELOPMENT

Riyadh AL-RIYAD in Arabic 17 Nov 80 p 5

[Article by Muhammad al-Sulayman: "Research Is Means to Agricultural Development; Riyadh University's Agricultural Experimentation Station Tests Irrigation and Crop Development Methods That Are Most Suitable to Climate Conditions; Experiments Conducted for the First Time To Compute Actual Water Needs of Plants; Sprinkler Irrigation System Proves To Be Least Wasteful Despite High Cost"]

[Text] The development of the agricultural sector is a matter of considerable interest in Saudi development plans since agriculture will become the second prop next to industry for the Saudi economy in the post-oil period. Agricultural production will also become a principal source for ensuring food to citizens of the homeland. Since the mutation of agricultural products cannot be imported in the manner in which technology and industrial machinery are imported, due to special environmental conditions, which are unlike those of any other environment, it was inevitable that agricultural products be developed in accordance with the conditions of the environment itself and with what is suitable to it. Hence comes the importance of establishing agricultural experimentation stations. These are set up by the Ministry of Agriculture and Water in various areas of the kingdom, and they are also set up by scientific organizations and universities.

Riyadh University's agricultural experimentation station, which is highlighted in this report, is carrying out this function in addition to the other scientific functions which it is providing to researchers and students at the university's College of Agriculture. The area of the station, which is located in the district of Dirab, south of Riyadh, is estimated to be 6,000 dunums. About 400 dunums in that station are being cultivated at present for educational purposes, for research and for guidance.

We met with station director, Dr 'Atallah Abu Hasan who told us about the purpose of establishing the station and about the cooperation [that was taking place] between it and other agencies to achieve the interests of the public.

Dr Abu Hasan said, "The purpose [behind such a station] is that any student in the colleges of agriculture or in other colleges needs to have botanical gardens for cultivating different kinds of plants. He also needs model fields so he can practice the agricultural operations of agricultural production. The student can thus be introduced to the different kinds of plants during their life cycle. The student learns how to treat the plants and maintain them under normal field conditions. The student also learns about all the operations that take place to immunize the plants. He also learns about harvest operations and crop preparation.

"At these experimental stations the student sees all these operations at the times when they are carried out. The student himself is also trained in the latter stages of his education in carrying out the various agricultural activities. For him, agriculture thus becomes not [just] a subject to be studied in books, but rather a concrete fact which he can see. He can obtain agricultural training in accordance with the most modern technological methods that are in use. By the time he graduates, a student would have practiced the science and the art of agriculture."

### Developing Agricultural Technology To Suit the Environment

"A station for research and studies has also been set up because agriculture is an art and an industry that is very closely tied to the environment. Despite the dire need and the urgent necessity for using modern technology in agriculture and for importing new and advanced ideas from the countries that are advanced in agriculture, we must develop these methods and try them under the conditions of the local environment. No matter how similar the local environment is to other environments, it will not be identical to them. Hence emerges the importance of the research and the experiments that take place in the local environment so that the best means can be selected and those which are most suitable to the agricultural environment and the rural society that prevails in our country can be identified. Every imported agricultural innovation is worthless in this field until its success can be established under the conditions of our agricultural environment. There are also numerous problems which farmers and producers encounter. These problems may pertain to plants, water or pests that attack the plants and cause production to be weak. Finding solutions to these problems and difficulties which face farmers and producers becomes a necessity. The only way such problems and difficulties can be solved is by research and study. Experiments provide the only means through which solutions and suggestions can be made for overcoming difficulties. This station was established to conduct these experiments and to provide the results to farmers as well as producers."

### Courses for Farmers

"Through the College of Agriculture the station offers specialized training courses to those working in the agricultural field for the purpose of upgrading their professional standards. The station also sets up the programs for these courses.

"The station also hosts the trainees in some of the training programs so as to acquaint them with the areas of production and with the agricultural activities that take place at the station."

The station has its own administrative organization which is suitable to the nature of the goals with which it has been charged. This organization produces a close tie between the station and the various scientific divisions.

A station director has been appointed. He has many administrative and executive powers; he manages and supervises personnel, and he also supervises all the activities on the farm in general. He makes administrative and financial decisions in the context of the farm to ensure the proper course of work on the farm. A special committee named the farm committee has also been formed. Its function is to discuss the farm's general policy, the implementation priorities of that policy and other scientific activities that take place on the farm since it is a station for agricultural experiments and research. Every member of the committee deals with his area of specialization. There is also an assistant who oversees the farm's technical units. Committee members are responsible for meeting the needs of these units, each in his area of specialization.

Carrying Out the Experiments

Mr Khadr Abu 'Isa, the station's immediate supervisor spoke about the technical units and said, "The farm is divided into a number of technical units. An agricultural engineer is responsible for each unit; and a number of workers is assigned to each unit. Every unit conducts experiments and oversees the agricultural operations that take place within that unit. Each unit has full responsibility for all the activities related to these experiments that take place in it. These units are:

"The maintenance and equipment unit. These units [sic] concern themselves with the maintenance of agricultural machinery since a large number of machines have been available to the farm which has become self-sufficient with regard to equipment. Farms now prepare [the soil], cultivate it and harvest [the crop] without delay. There are plowing machines, tractors, harvesting machines and seeding devices. A special workshop has been set up with a number of specialized technicians who repair and maintain all the machines on the farm.

"There is a field crops unit which oversees and conducts experiments on existing crops like clover and wheat. A number of agricultural engineers conduct these experiments. About 200 dunums are designated for field crops. These are irrigated by spraying. This area may be expanded in the future.

"There is a horticulture and fruits unit which oversees the orchards and the fruit trees. There is a plan to cultivate 170 dunums with fruit trees. These will be irrigated by modern irrigation: sprinkler irrigation. There are also 50 dunums cultivated with palms, and there are farms for grapes, apples, oranges and plums. Some of these fruits are not suitable to the environment, but the experimental cultivation of these fruits has nevertheless been successful. These experiments try to select varieties that are suitable to the environment so they can be cultivated. This unit is divided into several orchards, and each orchard is cultivated with a specific variety [of fruit].

"There is a prevention unit which oversees the farm by checking the plants for pests such as insects and bacteria. This unit sprays the cultivated plants periodically with pesticides to protect them from diseases to which they may be subjected.

"There is a forestry unit which was set up recently and is confined to 40 dunums. These donums are planted with forest trees and irrigated by sprinklers. There is also a vegetables unit which concerns itself with experiments on vegetables and activities to follow-up on these experiments."

## Solutions to Irrigation Problems

Irrigation is considered an important factor for the success of any project for farmers because of the importance of water to plants and because water is not available in large quantities in our land. Therefore, we must find solutions to reduce water loss and to give the plants no more and no less than the water they need. Dr Mahmud Hassan 'Abd-al-'Aziz, who supervises irrigation experiments, spoke about [the progress] achieved by science in discovering and improving methods of irrigation.

He says, "I conducted several experiments at the station to reduce water loss and to control irrigation averages so that irrigation would meet the actual needs of the plants with no water loss. This is being done through systematic distribution that guarantees the most suitable conditions for growth. There is no doubt that one of the methods, which is the sprinkler irrigation method, not only achieves the goal, but is also superior to the other high-efficiency irrigation systems such as irrigation by spraying and sub-surface irrigation.

"There is also a fully automatic device on the farm for regulating irrigation procedures. A special system that is suitable to each crop has been set up."

## The Pros and Cons of a Sprinkler Irrigation System

A sprinkler irrigation system is considered under many of the conditions that are critical for other irrigation systems to provide the best and the ideal solution. It is known that surface and sub-surface irrigation methods fail completely in the case of sandy soil or water with a high salt content. Irrigation by spraying also damages the plants: the leaves burn because of the high salt content of the water. The case is also the same for sandy soils in areas that are characterized by high winds.

The basic idea behind sprinkler irrigation rests on the notion of supplying the plants with the water and nutrients they need through small openings or outlets located near the roots of these plants. The water and the nutrients flow to the plants repeatedly or continuously at very small rates so as to give the roots of the plant the humidity that is suitable and adequate to the plant's needs at all times. The humidity of the soil may be allowed to fluctuate between 80 and 100 percent, and this would benefit the plant. The plant would thus not suffer the strain of trying to get the water it needs.

Sprinkler irrigation devices vary in shape, design and operating [method], but they all have a main device which includes the various control mechanisms and connects the water source or the principal water line to the distribution pipes that are laid out near the rows of plants. It is on these pipes that the openings or the outlets which provide the soil and the plants with nutrients are located. Water is distributed [through these openings] simply, slowly and under very low pressure. A sprinkler irrigation method makes the area where the roots are located always humid through the repeated flow of water, and this reduces the salinity that affects the plant.

There is no doubt that a sprinkler irrigation system is costly. This is due to the fact that capital is necessary for purchasing the pipes, the filters, the sprinklers and the various control devices. But before going ahead and adopting such a system, one must study all the analytical considerations such as cost per unit area for the crop; the alternative cost in case another system is utilized; and also the anticipated return under the conditions of the various methods. A comprehensive study of all the factors that affect the design [of the system] is also necessary, such as the area of the land; the source, quantity and quality of the water; and selection of the proper place for the control devices.

Before the system is put into operation, filters are to be washed, agricultural fertilizers prepared, and the device with all its parts is to be selected, attended to and maintained periodically. In addition to the various irrigation systems in the station, there is an experiment that is being carried out to compute the plants' actual water needs. This is considered the first such experiment in the Middle East.

### Modern Equipment

There are numerous buildings on the farm that serve the purposes of scientific research, training, guidance and managing and maintaining the various facilities of the farm. There is a farm administration building; there are homes for the agricultural engineers which consist of 12 units with their facilities; there is also a building for housing workers; and there is a building for managing the seedlings for the campus in al-Dara'iyah.

Three warehouses have also been built; each warehouse has an area of 300 square meters.

These warehouses were built in different locations on the farm so that the highest degrees of flexibility in operations and use can be achieved. A maintenance workshop has also been built; it has been equipped with the most modern devices, and its other requirements are being completed.

Four greenhouses have been built; two of them are for experiments and research, and the others are for growing seedlings.

Each one of the greenhouses is air-conditioned and fully equipped with devices which can be controlled according to the steps and conditions of an experiment. All the equipment in the greenhouses works automatically and can be activated by the control keys of the cooling or heating devices. [These control keys also] control the irrigation system or the direction of the sun's rays. This equipment is considered the most modern in the world. Included among the preparations that were made for the station was the construction of a 300 kilowatt power station. It has two generators, each with a 150 kilowatt capacity. The power station was designed to accommodate a third generator in the future. There is also a meteorological station on the farm furnished with the most modern equipment. It was built for the purpose of establishing full records of the climatic conditions that pertain to agricultural activities so that researchers can benefit from them in the research and experiments they conduct on the farm. The farm has also been furnished with numerous modern machines that are required by the variety of activities and operating requirements of the most modern scientific methods in accordance with special standards that are consistent with climatic and environmental conditions in the kingdom.

Conducting Scientific Research

The station director spoke about the cooperation between the station and other agencies.

He said, "The research station participates in many of the activities of the other government institutions. The college has consistently contributed its technical capabilities to [the activities of] Tree Week during the last few years. During that week the station provides assistance in guidance, and the college cooperates with the National Center for Science and Technology in the area of research where four research projects that pertain to agricultural production are underway.

"All the agricultural activities that pertain to planting and preparing seedlings, decorative plants and gardens take place at the research station. These activities are needed by the college buildings and administrations on the campus of Riyadh University on al-Dara'iyah Road.

"The college offers training courses in the agricultural field to workers and engineers.

"The station cooperated with the Ministry of Trade which had asked that experiments be conducted to find out how much oil there was in a certain kind of decorative plant. These experiments were carried out; the percentage of oil was estimated; and [the results] were submitted to the Ministry of Trade."

Future Plan for the Station

The station is trying to offer services and to achieve the goals to which the kingdom is aspiring: progress and advancement in agricultural production. Officials in the College of Agriculture try to make the station's work easier, and they try to ensure all its needs. When water becomes available, the station hopes that the cultivated terrain will be expanded in all the areas of the station and that those areas which need reclamation will be incorporated into programs whose objective will be to reclaim those areas on an experimental basis. The station also hopes that the area which is cultivated with fruit trees--about 250 dunums--will be doubled and that fruit trees will be grown and studied.

A building for students will be built where they can live during the training period, while experiments are being conducted.

The station will also seek to expand [its activities] in the field of agricultural research so that solutions to problems that face farmers in all areas of the kingdom can be found. The station will become a center for disseminating the most modern methods and results [in agriculture] that are based on scientific research. The farmer and producer can be guided by these methods and results in their field of production. The station will take part in training the professional staff who work in the agricultural sector because it has modern and technologically advanced methods in the field of agriculture.

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SULTANATE OF OMAN

## BRIEFS

CRUDE OIL EXPORTS DOWN--Oman's crude oil exports fell from a total of 9.2 million barrels in September to 8.5 million bbl last month, an average of about 275,000 b/d, Petroleum Department Oman announced. No explanation was given for the drop. Oman's terminal outlets, which all lie east of the Straits of Hormuz, have not been affected by the fighting between Iraq and Iran, while the halt in supplies from those two countries has meant that there is a market for as much oil as Oman wishes to export. The official price of Oman's crude is $33.40 per bbl, while the government was recently asking an additional $3.10 per bbl for contract sales. This is well below prevailing spot prices. The September export level was higher than the monthly average of about 9 million bbl achieved in 1979. It remained substantially lower than the 360,000 b/d average which the Omani Minister of Trade and Industry, Muhamad Zubair, recently told this newsletter was the official short-term export target. [Text] [Paris AN-NAHAR ARAB REPORT & MEMO in English 24 Nov 80 p 8]

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